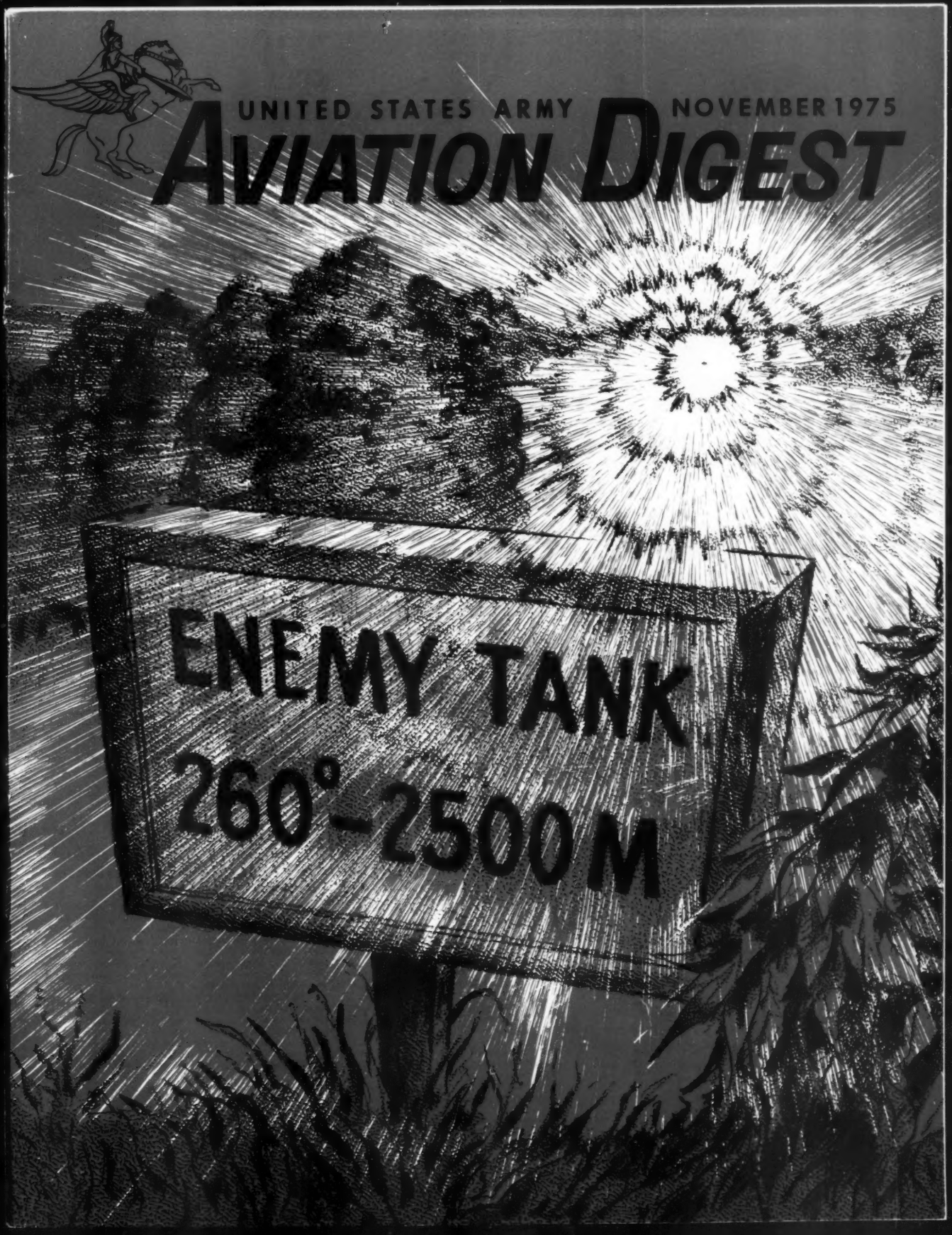
UNITED STATES ARMY NOVEMBER 1975

AVIATION DIGEST



UNITED STATES ARMY AVIATION DIGEST

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VANGUARD OF FREEDOM
BICENTENNIAL 1775-1975
UNITED STATES ARMY

MG William J. Maddox Jr.
COMMANDER
U. S. ARMY AVIATION CENTER
A major activity of the
U. S. Army Training and Doctrine Command

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COMMANDER
U. S. ARMY AGENCY FOR AVIATION SAFETY
A major activity of the
Inspector General and Auditor General
of the U. S. Army

Richard K. Tierney
EDITOR
U. S. ARMY AVIATION DIGEST

ABOUT THE COVER

The time to get "set" for the enemy threat is now! See page 1

* * *

If the front cover is held at a normal reading distance of about 16 inches, the tank will be about the actual size—1/25 inch—that it would appear to the naked eye at 2,500 meters. Thanks to Doug Carter for the cover art

The mission of the *U.S. ARMY AVIATION DIGEST* is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

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TRAINING

The Cobra Pilot/Gunner Team

Colonel Jack L. Mullen

Office of Combat Support Directive
HQ MASSTER
Fort Hood, TX

ON YOUR MARK . . . GET SET! . . . Every red-blooded American knows what's happening. A runner is poised to explode out of the starting blocks. He has intensely focused his physical and mental faculties on springing into the stretch of track ahead. He is poised. He is *Set*.

Set, as a characteristic of human behavior, applies to our perception of what we are doing and what we are about to do: sets us up with a single-minded sense of purpose . . . *A helicopter approach to the ground . . . confined area . . . gusty wind . . . every faculty of hand/eye coordination—psycho motor skill —brought immediately to bear for response to multi-*

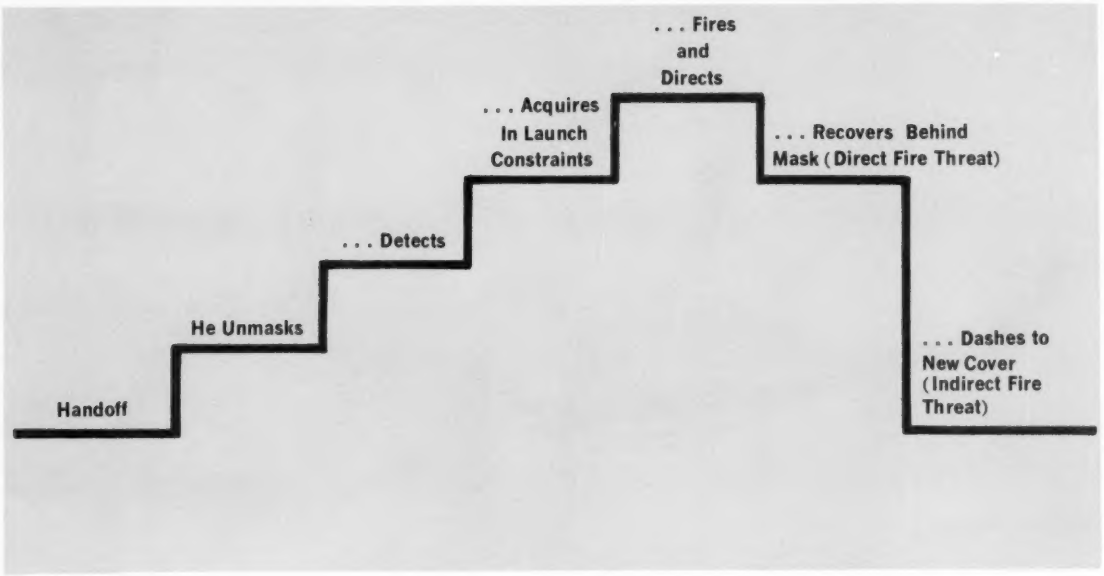


Figure 1.

ple signals as the craft closes with the touchdown point.

Being set saves time—precious seconds. Establishing set requires planning, training, conditioning—both mental and physical.

How do we establish and hone the set in an AH-1 Cobra gunner/pilot team which shaves seconds from TOW (tube-launched, optically-tracked, wire-guided) missile tank engagements?

Let's look at the handoff to detection phase of an engagement sequence (figure 1).

Handoff: ". . . Tank, 350 degrees, 3,000 meters."

When the crewmen break mask and see the tank will they waste seconds by thinking, "How incredibly small it looks!" Or will they be *Set* for an object diminished to a precise size by a preception deluded by distance?

Training Managers! Let's put a life-sized model of a specific tank in full view of our home base helipads at a variety of potential engagement ranges with signs at the pad that read:

There it is, every day a mental photo—a tank at 2,500 meters.

Another location 4,000 . . . another at 3,000 . . . a memory bank ready when the starter says, "get set!" That is a simple *set*. It is called up by the cue, "handoff."

How about the first guy to look at the battleground? How long does he want to be exposed

above masking terrain or vegetation?

Do you remember the speed reading course where numbers were flashed on a screen for a fraction of a second and you wrote them down—six numerals, seven numerals, eight numerals? It is amazing how with practice and intense concentration the mind retains so much from a snapshot view. You got *set* for the flash, and then you recorded the info from an instantaneous mental photo.

If the AH-1 Cobra gunner and pilot decide before they break mask roughly where they will be looking during a brief interlude of exposure to direct observation, we can translate this assumption into a training situation to sharpen the *set* of crews.

Phase I, The OP Phase: The crewmen sit in chairs on a hilltop (or in a framework simulating a Cobra at a hover above a terrain mask). Their vision is blocked by a screen (figure 2). In the target area are several groupings of targets at varying ranges and azimuths from the observation post.

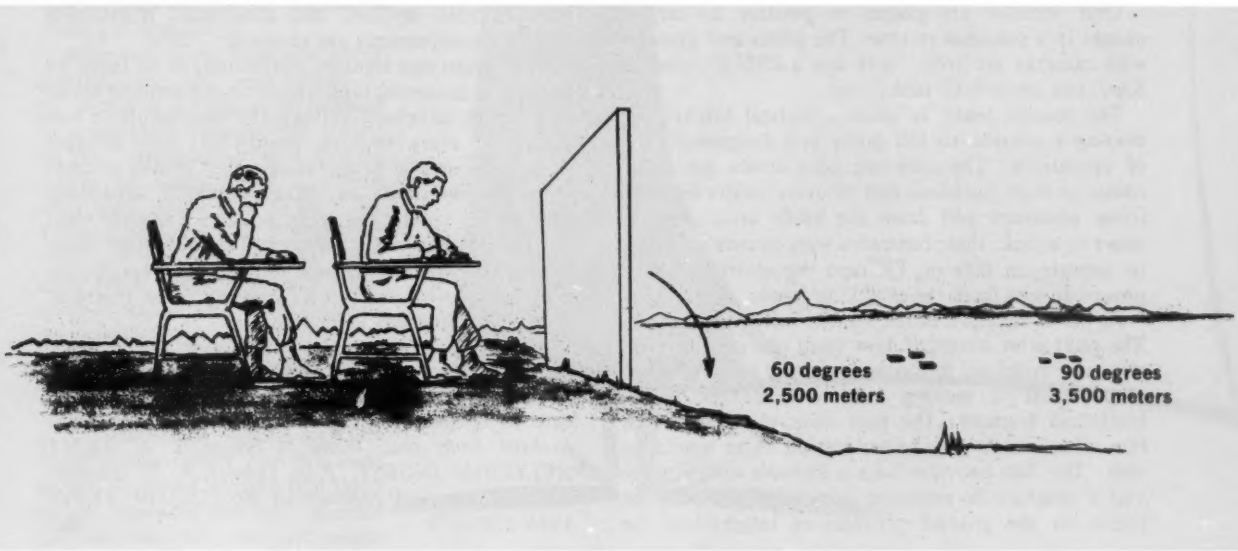


Figure 2

A command: ". . . 60 degrees, 2,500 meters." The screen drops . . . the targets are exposed briefly, then the screen returns to block their view. They record. A new command, the screen drops, returns and the crewmen record.

The target arrays are colored panels. The number of panels at each location changes with each exposure. The training manager (commander?) can expose each crew to a wide variety of observations with ever decreasing observation intervals.

Phase II, Aircraft Phase: The crewmen mount Cobras and move to programed surveillance positions for a similar series of observations. In this phase support troops manning simulated threat weapons record the exposure times. Commanders can critique the accuracies of observation related to exposure times on an individual crew basis at the end of a session. Crews will sharpen the *set* which associates targets with terrain and time.

A third and more complex *set* relates to total terrain awareness. Terrain, just like a G-2 weather report is valueless unless related to mission and situation. Helicopter crews must assess folds in the earth and vegetation in terms of their mission and the threat (fairly academic during mission planning on a map prior to takeoff—more complex as the drama of mortal combat unfolds).

The ability to use terrain to advantage comes to all Soldiers only through experience and disciplined use of terrain in every training situation. Twenty years ago a battalion commander took a whole flock of us second lieutenants on a terrain walk and related patches of ground to firing positions, assembly areas and avenues of approach. That walk remains a career long training highlight.

Terrain "walks" on foot, in jeeps, and even in buses (at Fort Leavenworth, KS) have telescoped whole battles into a few good hours of the "old man's" point of view on the ground we fight over.

Helicopter Force Commanders! Try a terrain walk over a few hundred acres in helicopters. Your insight, on the spot, over FM (frequency modulation) radio relating terrain to a tactical situation is irreplaceable. An inflight discussion which relates the

ground, vegetation and enemy threat to a mission is an essential part of establishing the *set* or conditioned instinct for nap-of-the-earth decision making on a battlefield of seconds. Here is a training drill which can sharpen this instinct.

Terrain Training Drill For Attack Helicopter Teams:

. . . Oh wad some power the giftie gie us
To see oursels as others see us!
It wad frae monie a blunder free us,
An' foolish notion . . . . Robert Burns.

Two attack helicopter platoons work together. One attacks, the other mans a target array with hand-held motion picture or television cameras. The threat is visualized on the ground as part of an attacking mechanized armor battalion (implies we have studied and achieved an intimate knowledge of the threat).

Unit vehicles are placed in position as targets caught in a snapshot in time. The pilots and gunners with cameras are told, "you are a ZSU-23; you an SA-7; you are a T-62 tank," etc.

The second team is given a tactical briefing including a mission to kill tanks in a designated area of operations. The crewmen plan attack positions, routes to these positions and recovery routes between firing positions and from the battle area. As they move to attack, their comrades with cameras attempt to capture on film or TV tape the episodes of exposure as seen from the attacking force.

At the completion of the attack, roles are reversed. The pilot who observed how team one used the terrain can make an immediate positive transfer of his observations to making more efficient use of the battlefield features. The post exercise critique with film allows each pilot to see himself as he would be seen. The film provides both a measure of technique and a measure of exposure durations. Manning the threat on the ground provides an insight into the time space factors related to threat distribution.

A terrain walk by helicopter, coupled with the terrain training drill, followed by a discussion and critique using film or TV tape as a focal point can generate a dynamic dialogue within a unit on better *set* plays; improve techniques in terrain use; and provide a vehicle for discussing integration of fire support, smoke, and chaff into the scheme of maneuver of the attack helicopter platoon. The aggregate effect of the terrain drills is a development of the *set* which will help the battle lieutenant intuitively relate terrain to situation and mission at the rate demanded on the shifting battlefield of seconds.

The suggested training situations discussed in this article are purposely focused on means readily available to units in the field. With the exception of cameras, which are not impossible to acquire, no new sophistication is needed beyond the initiative of the unit. Follow-on applications for simulation, TV tape tutorial devices, and automated multimedia training environments are obvious.

The tempo and frenzied distractions to be faced by helicopter-mounted, tank-killing teams demand training which develops *set*—establishes intuitive response. In every training project the final product must be a mental programing which shaves seconds from the multitude of decision-making situations. The quick, young and agile minds are eagerly waiting in cockpits, ready rooms and on our flight lines. They need the insights available through imaginative unit training—so they don't have to learn their lessons on the first day of the battle.

Editor's Note: If your unit tries any of Colonel Mullen's suggested training techniques—or if you care to comment on them—the DIGEST would like to hear from you. Write to Editor, U. S. ARMY AVIATION DIGEST, P.O. Drawer P, Ft. Rucker, AL 36362—or call commercial 205-255-3619; AUTOVON 558-3619.

First New C-12A

Twin-Engine Utility Aircraft Accepted

The U.S. Army has accepted the first new Beechcraft C-12A twin-engine utility aircraft, a slightly modified version of the Super King Air 200 T-tail design.

Under a $20.6 million contract awarded last August, Beech Aircraft will produce 20 C-12As for the Army. The contract carries an option for Army purchase of 20 C-12As per year for 5 years. Deliveries of the aircraft will continue through next May. Beech Aircraft will support the aircraft worldwide, providing personnel, maintenance and spare parts at strategic locations.

First of the Army C-12As will be stationed in Iran, where they will be operated as staff and cargo transports.

The Itis Diseases

Captain William R. Riddle

Student Officer Company, School Brigade
U.S. Army Signal School, Fort Gordon, GA

"DRIVE-ON-ITIS," "get-home-itis" and "wild-blue-yonder-itis" are closely related. And, when they work in combination you really have a lot going against you. I can remember one mission which I was on that typifies this combination. It was a very routine mission that easily could have turned out disastrous.

We reported to the airport at 0730 hours for an 0900 takeoff. Then the cargo was late arriving and we didn't get off until 1040. After an uneventful 4+45 flight to a Midwest Air Force base we were tired, hungry and thinking about nothing but getting unloaded, back in the air and home (enter get-home-itis).

After our usual hour and a half ground time we were ready to go—but then the starter on number two wouldn't engage. No sweat, we just happened to have a spare starter on board. But, it is now after duty hours and the local Air Force troops are not available to work on our bird. So our crew-chief bums some lights and maintenance stands and all three of us go to work.

Naturally we don't have the right tools but we "can-do" it! When we finally recowl the UH-1 it is 2300 hours. Should we RON (remain overnight)? *No!* We want to get on home because first thing in the morning we had planned this or that. Also the bird might be needed (enter drive-on-itis).

So, after a few greasy cheeseburgers we finally take off at five minutes after midnight. No sweat, it is a beautiful night—and we are VFR (visual flight rules) all the way out. Going home, we log 2 hours of night weather. But we finally get home at 0420, after 23 straight, very strenuous hours without sleep. Once again Army aviation has triumphed over all obstacles and accomplished the mission. And, we made that outing in the morning.

Were we wise, or safe? To start with, I knew I "had" to be back the next day. But, with the fuel crisis and reduced flying time, the other strain of the disease "itis" – wild-blue-yonder-itis – surfaced. When you finally get a mission you are very reluctant to cancel out—*for any reason.*

The crux of the matter is that we must be aware of our tendency to fall prey to one or all of these "itis" diseases. I now realize how lucky we were to make it home without a serious mishap. And we had all three of these "itis" diseases. Just the other day I heard about some others who weren't as lucky. "Get-home-itis" *alone* was fatal for them.

NSIA SYMPOSIUM

Opening and closing remarks by
MG William J. Maddox Jr.
Commander, U.S. Army Aviation Center

CONFEREES, I want to welcome each one of you to Fort Rucker. This is a relatively small post tucked off here in the southeast corner of Alabama, in an area known as the Wiregrass. Although not large, Fort Rucker is most important to the U.S. Army.

We have three main sides to our house here at the U. S. Army Aviation Center:

- *The combat developments side,* which basically covers the matters we will be telling you about for the next two days. You will hear from the people who determine what the Army aviation doctrine and hardware requirements are for the future.
- *The training side,* which accomplishes *all* individual Army flight training. We train all of the Army's UH-1 Huey and OH-58 Kiowa mechanics and its air traffic control and flight operations personnel. We have the warrant officer career college, the upper class of which is all Army for chief warrants three and four, Army-wide.
- *The standardization side,* which provides a common yardstick for the operation and employment of aviation throughout the Army. Its people develop the publications and procedures for operating aircraft; conduct assistance visits; and influence the Army as a whole in the operation and employment of Army aircraft.

Just like NSIA (National Security Industrial Association), the Aviation Center is a non-profit organization without selfish, narrow, self-serving interests. We deal with an important part of our national defense. *Important,* particularly in the last dozen years or so, when Army aviation—or the philosophy of airmobility—came of age; when it acquired the equipment and the know-how to accomplish all of the five functions of land combat on the battlefield with aircraft instead of the traditional ground means.

We have invested some 16 3/4 million flight hours in 11 years of combat in the Republic of Vietnam. And, as we are out of Vietnam, we have a force of about 10,000 modern aircraft and 18,000 aviators. We have a family of five-type rotary wing aircraft:

- The basic Huey that performs the troop lift and lightweight lift job; command and control; medical evacuation and other related missions. It is the general workhorse.
- The AH-1G HueyCobra is the attack helicopter. The Cobra is a derivative of the Huey.
- The scout, or light observation helicopter. We have two models, the OH-58 and OH-6 Cayuse, basically doing the same mission.
- The medium lift helicopter, the CH-47 Chinook.
- The heavy lift helicopter, the CH-54 Crane.

On the fixed wing side, we have the OV-1 Mohawk surveillance aircraft and the U-21 Ute which is used for command transportation and electronic surveillance.

For the future, we are improving the OV-1 and the U-21 type aircraft. We still will retain the same five-member family of rotary wing aircraft. But we're looking for improved capabilities with the UTTAS, or Utility Tactical Transport Aircraft System, to do the UH-1 lift work in the 1980s and 90s; an advanced attack helicopter (AAH) to provide aerial fires; and an advanced scout. The UTTAS and AAH already are undergoing development and will be in flight evaluation next year. We plan to take the modification of the CH-47 to Defense Systems Acquisition Review Council (DSARC) this fall and then, of course, we are still working on the heavy lift helicopter which is having its problems in the Congress right now.

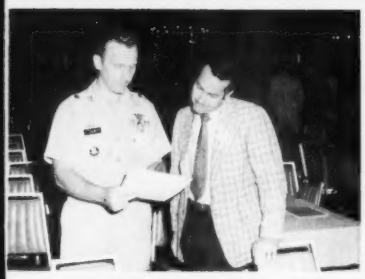
I want to take a moment to go back beyond the Vietnam battlefield to another battlefield—one where we had sort of a one-on-one situation. There was a little guy who was challenging the king of the roost. He recognized that he had to use some tactics other than the standard everyday tactics that the king of the roost was employing.

The king of the roost, of course, was Goliath and the little guy was David. David figured out that if he got into close grips with Goliath, he would be no match for the giant. Sure, he was pretty agile, but he wasn't nearly as strong.

So David devised an early application of stand-off tactics. He picked out a point target weapon and practiced sufficiently so that it was both reliable and accurate. Then he managed to fell Goliath on the battlefield.

David then was exactly where we are today in the aviation business as we prepare to outfit ourselves for the high threat battlefield. The battlefield is going to be mechanized; the prime vehicle will be a tank. We'll consider the tank as Goliath, the vehicle that normally is only killed by another tank.

We in the aviation business have looked at this particular problem. We know that if we get within



1. MG William A. Becker (Ret), Mr. Hans Weicksel of Bell Helicopter and Mr. Bob Ames of Textron, who was chairman of the symposium, confer during a break. 2. COL James L. Tow, 2.75 inch project manager, and Mr. Bob Bergman of the 2.75 inch project manager's office, confer before the 2.75 inch presentation

reach of the tank and its accompanying antiaircraft weapons, "Goliath's" brawn is going to out-distance brains. So we have done just what David did. We developed a reliable and accurate antitank capability and placed it on the relatively vulnerable helicopter. Accordingly, we have worked out tactics to keep the helicopter from getting hit by using the terrain for cover, much as the Infantryman does instead of standing up and walking across an open field against the enemy.

We think that for the first time, we have a capability to do the heaviest job that can be found on any battlefield—that is to kill the tank and its accompanying antiaircraft weapons. That means that we here at Fort Rucker have to be very busy. We're busy with the new tactics, and we're busy radiating them throughout the rest of the Army. We do this with our training programs which pump students out to the Army, both through initial entry students—those who're just receiving their wings—and also graduate students, those who come for aircraft qualification or for instructor pilot qualification. *We also get the word out through our standardization program.*

As I said earlier, combat developments, training and standardization are major parts of our direction here at Fort Rucker. But an equally major part is our conviction that there is more in the aircraft and people we have than we're actually getting out of them. So, we've undertaken a lot of work to improve our staying power—to keep us on the battlefield on a 24 hour-a-day basis; to make us effective in adverse weather as well as good clear weather, and in an electronic warfare environment or chemical biological condition.

That's quite a challenge! You're going to hear about initial entry students whom we have flown low level, that is 100 to 200 feet at night under varying lighting conditions without night-vision aids. You're going to hear about tactical instrument flying, where you zip along about 400 feet over the highest terrain and you make a spiral letdown to within 50 feet of the ground, just by training to do it [see "Tactical Instruments," page 17, October 1975 *DIGEST*]. We will continue to develop new tactics and strive to get more out of the people and equipment that we now have.

Additionally, we shall accent our efforts to improve the equipment and the aircraft for the future, and that's the aspect that this symposium is going to address.

I'll be back with you this evening. In the meantime gentlemen, consider very carefully how we're going to get little David outfitted for this next battlefield.

Closing Remarks

I appreciate the National Security Industrial Association and its sponsorship of this symposium which lies right in line with my belief, in fact Fort Rucker's belief, that we must have continuing and close contact with the industry of these United States. This is the only way to get the most out of the technology and abilities we have.

We have challenged you. I hope that you accept the challenge and will come back to talk to us . . . . While you're back on your jobs . . . we're going to be here working with people and machines. We'll be working out the SOPs (standard operating procedures) for the radio silence business; for the night flying business; and the crew duties in aircraft.

If you are in a scout with two pilots in it, one a copilot-observer, and you're going out to the front, the pilot is flying nap-of-the-earth. He's occupied outside of the aircraft while the observer is reading his map and getting the pilot to the right place at the right time. But when he gets to the right place at the right time, there's got to be a switch in duties. The pilot then becomes a navigator as well as a pilot. And, the observer is very busy looking for targets. He's not as concerned with where he is, as he is with what he can see in the way of targets to pass to attack helicopters. There are all sorts of things like this that must be worked out.

We admit that we're doing a lot of things that haven't been done by anybody before, or at least not as completely as necessary. If we are to be combat effective in that first battle of the next war, we must become experts in these matters. But there is a caution here. If you are doing something new, it requires that you do it as completely as possible and that you carefully consider the risks, problems and all the headaches involved. At the same time, if you are outnumbered, it's going to take some new tricks of the trade to come out on top. You cannot let the problems overpower you, or you end up not doing anything new.

So we recognize we're doing something new. We recognize the problems we face. We have that positive orientation and we hope that we've shared it with you—and that we've convinced you that you ought to join us.

SOMEWHERE FAR AWAY

LTC George L. O'Grady

Technical Branch
Operations and Plans
HQ MASSTER
Fort Hood, TX

SOMEWHERE, FAR away from everywhere there must live those special beings that watch over the folly of man. They indeed must have a tremendous sense of humor or it would be impossible to watch our blundering and making mistakes on a daily basis.

Such special beings, though removed from the rest of us, have special ways of seeing what we are doing or are about to do. One group watches our military efforts with great care. In 1960, sitting around a crystal ball and before a comfortable fire in their cave, one turned to the other and said, "Hey! You

see what those guys are going to do now?"

"No, what are you talking about?"

"I'm talking about some soldiers in the United States Army. They are starting some extensive helicopter tests. They think the helicopter, of all things, can be a war machine. I can't see too clearly but it looks as though they are going to introduce the helicopter into the Republic of Vietnam in a big way."

The second being looks up in total shock and disbelief. "Impossible! They really are out of their tree now. The helicopter is O.K. if used as an ambulance behind the lines as it was in Korea but it will never survive in Vietnam. Why, in Vietnam they're going to be shot at. Those crazy machines will fall as feathers from one big torn pillow. Actually those feathers will have the flight characteristics of a rock!"

"Wait!" says the first, "the fog is clearing. I can see better now and time is passing . . . they did it! It worked!"

"Yeah," says the second, "but they got lucky. I'm looking at the same thing you are! Vietnam has been classified as low intensity conflict. They got away with it this time but they'll never make it in mid to high intensity."

"Why not?"

"Survivability, man! Survivability is the key. They just can't survive!"

"Well . . . " says the first, "I'm still looking and here's the way I see it. Rather than me say it, look with me and watch this briefing that's going on right now. Reception is pretty good today so let's listen."

* * *

"Sir, survivability of the attack helicopter as an integral part of the combined arms team falls into two general areas—*hardware* and *tactics*.

"*Hardware* to improve weapons, reduce visual and electronic signatures, increase maneuverability and decrease vulnerability will continue to be developed with a healthy research and development (R&D) program.

"*Tactics*, on the other hand, can be addressed and good tactics be implemented now by using current machines and weapons. Tactics, if developed to the advantage of the helicopter, will be directly related to survivability. The tactics to be considered are derived from the principles of attack helicopter employment and combined arms employment.

The *DIGEST* has available copies of the recently compiled "Tactics Sampler." Interested aviators and commanders, both active duty and reserve may obtain copies by writing to:

Editor
U.S. ARMY AVIATION DIGEST
P.O. Drawer P
Ft. Rucker, AL 36362

"Principles of aviation employment are outlined in FM 90-1, Employment of Army Aviation in a High Threat Environment. Specific attack helicopter employment procedures include:

- Engage the enemy at maximum effective range, disengage prior to his maximum effective range
- Engage first
- Have an egress available throughout the engagement
- Engage with the greatest violence available
- Avoid duels with any enemy weapons
- Preplan engagements to use ordnance delivery by other weapons sources to complement helicopter firepower on the intended target or to divert enemy attention, thus reduce his target acquisition capability and reduce the chances of his engaging the helicopter

"The helicopter is and will continue to be a relatively "flimsy" machine. It cannot tolerate severe punishment—be it from enemy firepower or the stringent environment of flight. It carries but limited ordnance loads when compared to conventional close air support (CAS) aircraft. The employment tactics differ from conventional CAS aircraft because helicopter advantages are the high speed fixed wing aircraft disadvantages and vice versa.

"The attack helicopter does not bomb a target. It is far too slow to approach and depart the target with a bomb. The speed of the fixed wing aircraft allows heavy ordnance including dumb or smart bombs to be employed. Because the helicopter is slow it has several advantages over airplanes. It can fly lower, turn faster, even stop closing on the enemy. It has weapons that can be fired off-axis thus bringing fire on targets of opportunity faster than deliberate fixed-axis delivery weapons associated with airplanes.

"Airplanes carry more ordnance; helicopters are more discriminatory with less ordnance. One complements the other and under many conditions they can and should be employed together. Unfortunately dual employment is a little discussed subject. As attack helicopters and even Tac Air (tactical air) have learned to work in conjunction with artillery, so should Tac Air and attack helicopters learn to work together. Specifically, given a target that has air defense, a coordinated attack can be planned. If helicopters and Tac Air are sent against the target, the air defense would be alert and most concerned

with the obvious threat—Tac Air. As the counter engagement is concentrated on the airplanes, the helicopters can attack, causing disruption in the air defenses thus allowing the airplanes to concentrate the attack on the intended target. Current doctrine does not consider this approach. Basically, training, understanding and common communications links by any type radio would make it possible.

"Other combined arms concepts apply to the helicopter if the helicopter is considered a ground combat vehicle. The air cover required for any ground combat operation applies equally well to the helicopter. The major difference in a ground combat vehicle and an attack helicopter is not the dimension of air movement, rather the mobility or rapidity of movement the helicopter has compared to jeeps or tanks. A screening action by a ground force or reconnaissance mission requires coordinated action. The helicopter can have a dual purpose. It can be the eyes or an element of the supportng firepower.

"The attack helicopter can be artillery support, particularly if the mission area cannot be covered by conventional artillery. The attack helicopter has extended time over the target. Tac Air on call has a definite reaction time or if airborne is limited in its time over target. The attack helicopter can be brought forward and positioned for quick reaction. Often times in less than optimum weather conditions the attack helicopter will have to replace Tac Air. It will never carry the heavy ordnance of Tac Air but with a 200-foot overcast and 2 miles or less visibility, something is far better than nothing. Survivability then is survivability of the whole force, not just the helicopter portion.

"Survivability is directly related to who shoots first and who shoots farthest. With this in mind, FORSCOM (U.S. Army Forces Command) has been 'boosting' its program to train attack helicopter gunners. FORSCOM is taking steps to improve its ranges and ensure that range restrictions allow realistic helicopter gunnery firings.

"MASSTER (Modern Army Selected System Test, Evaluation and Review) has access to superior ranges and has conducted extensive running weapons tests the last few years. FORSCOM has taken advantage of this and is implementing MASSTER's successful results.

"Another area receiving a lot of attention is simulation. Inflight simulation and fullflight simulation are technologically available now. Inflight simulation would be a sophisticated electronics pod carried on the wing. The pilot would be able to go anywhere and simulate an attack. He points, he pulls the trigger; the computer and electronics determine if the selected ordnance would have done the intended job and provides a cue in the sight as to what would have happened. Fullflight simulation is similar to the Fort Rucker instrument flight trainer with a VFR (visual flight rules) capability.

"Survivability of the attack helicopter is fact now. With current equipment and improved training, survivability will be the result of a well planned combined arms mission. The known and suspected deficiencies of current and near term equipment will continue to be addressed by the R&D [Research and Development] community. Success in hardware programs will not alter the field commander's tactical employment significantly. They will assist the overall performance of attack helicopters and will be welcomed by the men who must use the equipment. Meanwhile, let's continue to employ innovative tactical concepts."

* * *

"Well," says the first, "that's quite a briefing. But looking any deeper into this crystal ball is difficult. There's a lot of fog. I guess we'll just have to wait a while longer and see."

"Yeah, but it's not as silly as it first sounded, is it?"

Suggestion Wins $300

Specialist 6 Albert V. LaMere is shown receiving a certificate and a $300 award from Major General Jack C. Fuson, former commander of the U.S. Army Transportation Center, Fort Eustis, VA, for a safety suggestion which should end the possibility of engine hot starts on the OH-58A helicopter.

Figure 1

Hughes 500C

HELICOPTER SAFETY

Thomas R. Stuelpnagel

Vice President and General Manager
Hughes Helicopters
Division of Summa Corporation

THE HELICOPTER is fast becoming the safest general aviation air vehicle because of developments during the last 10 years. These developments are exemplified in the Model 500C helicopter (figure 1) which has been internationally used for commercial operations for the past 6 years. (This helicopter essentially is the same as the Army's OH-6 Cayuse.)

The design objectives for the helicopter are reflected in figure 2 which illustrates the three levels of safety designed into the helicopter.

The helicopter is designed with structural redundancy to prevent catastrophic failures at the *first*

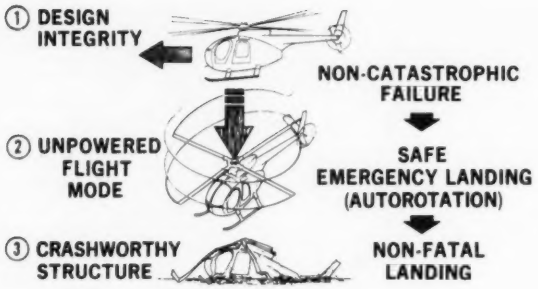


Figure 2

Design Objectives—3 Levels of Safety

level of safety. Should a failure causing loss of power or forced landing occur, the aircraft then reverts to a *second level* of safety consisting of an unpowered flight mode (autorotation) to permit safe emergency landings. The rotor system maintains its energy during descent which is then converted to lift a few feet above the ground, cushioning the landing.

Should the flight or ground conditions not permit a soft landing, the helicopter reverts to a *third level* of safety consisting of crashworthy structure. This minimizes injury or fatality during landing even though the aircraft structure may be destroyed.

The first level of safety, design integrity, consists of such items as: safe load factors; selected load paths; redundant load structure; safety devices; simplicity of design; derated engine power and center of gravity control. The propulsion system shown in figure 3 illustrates the application of some of the design integrity techniques. A static mast is used which separates the lift and torque loads of the rotor, resulting in design simplicity, high reliability and increased safety.

The rotor drive shaft is required only to take torque loads and, in addition, is designed to shear should any of the other propulsion system elements

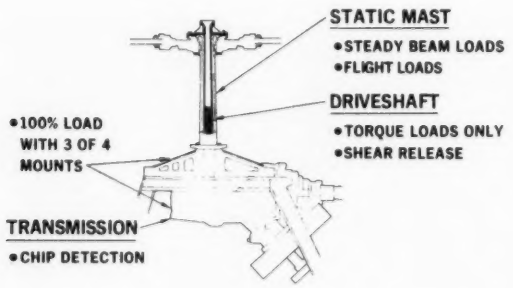


Figure 3

Propulsion System

jam. These features help provide a freely rotating rotor and its retention by the static mast for a safe autorotation landing. In addition, the mast and transmission mounts are designed with redundancy so that three of the four mounts will take 100 percent of the flight loads. Also, the transmission uses a chip detection safety device which has resulted in never having a catastrophic transmission failure.

These design techniques for the rotor system have greatly reduced the problems of rotor separation, even under crash condition. Retention of the rotor under a crash or blade strike condition is of prime importance in helicopter safety. Rotor blades in a light helicopter have the equivalent kinetic energy of

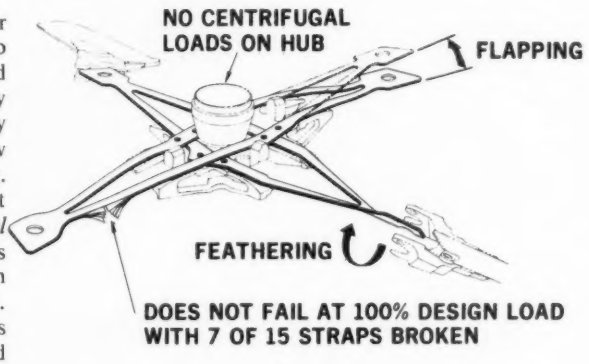


Figure 4

Main Rotor Strap Retention

a typical automobile traveling 60 miles per hour. By retaining the rotor on the helicopter during a crash or blade strike, this energy is dissipated at a controlled distance away from the occupants. In addition, there is no propagation of rotor energy into the cabin area where it could cause an injury or fire hazard.

The main rotor strap retention system shown in figure 4 also illustrates the application of design integrity techniques. A laminated strap assembly is used in lieu of bearings to facilitate flapping and feathering motion of the rotor blades. The centrifugal loads are taken by the straps and not the hub. Furthermore, the laminated strap assembly is sufficiently redundant such that it does not fail at 100 percent design load with 7 of 15 straps broken. The simplicity of this design eliminates numerous components which might contribute to system failure.

The helicopter also uses rotor blades designed to be fail-safe (figure 5) which provide for full redundancy in fastening. Both adhesive and mechanical fastenings are used to hold the blade root and tip weights to the blade spar. Either fastening is designed to take 150 percent of the maximum load re-

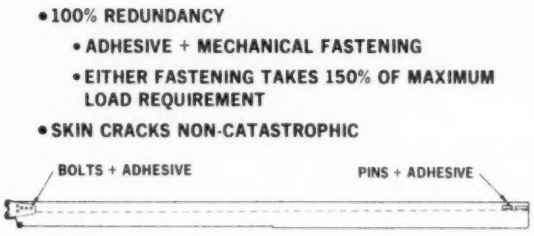

• 100% REDUNDANCY
• ADHESIVE + MECHANICAL FASTENING
• EITHER FASTENING TAKES 150% OF MAXIMUM LOAD REQUIREMENT
• SKIN CRACKS NON-CATASTROPHIC
BOLTS + ADHESIVE
PINS + ADHESIVE

Figure 5

Fail-Safe Rotor Blades

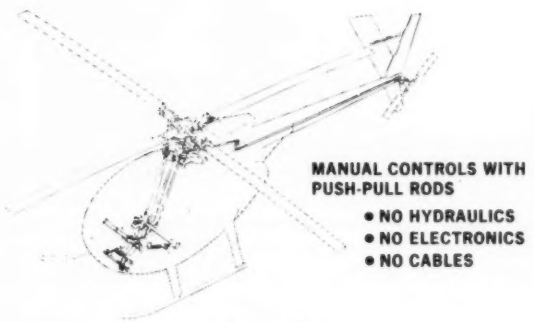


Figure 6

Simple Flight Control System

quirement. This type of design also prevents skin cracks from becoming catastrophic failures.

Helicopter safety is further helped by the use of such safety devices as: an engine-out horn and light to warn the pilot; automatic engine reignition system for inflight restarting; inertia reel seat harness for crash restraint; and emergency floats which are rapidly inflated in flight in the event of emergency water landings.

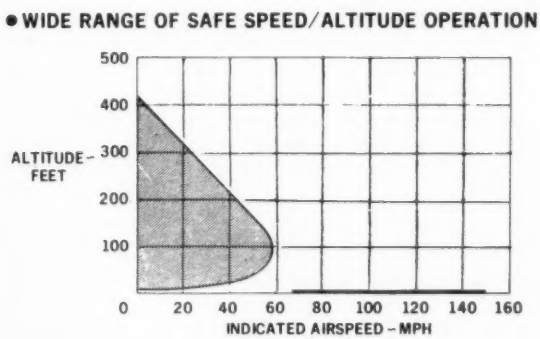


Figure 7

Unpowered Flight Mode

The elimination of components as a means of achieving greater flight safety is illustrated in the simple flight control system shown in figure 6. The aircraft uses manual controls with push-pull rods and has no hydraulics, electronics or cables in the control system.

While helicopters are normally sensitive to load positioning due to the criticality in the travel of the center of gravity, the helicopter is designed to allow wide load position flexibility since the cargo area is directly under the rotor centerline on the center of gravity.

Helicopter takeoff ability is partially a function of load size and weather conditions relative to the available power. Inadvertent overloading and atmospheric

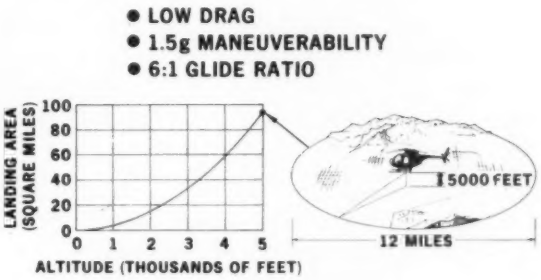


Figure 8

Landing Selectivity

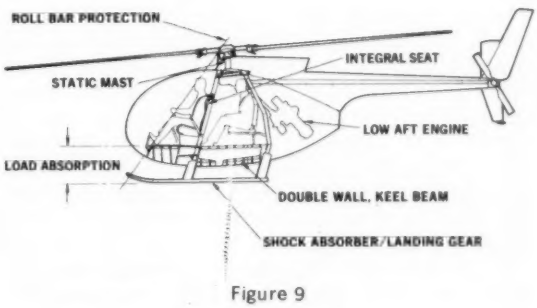


Figure 9

Crashworthy Structure

changes causing increased ground temperatures are potential hazards to safe takeoff. The way to overcome potential problems is to have reserve power as is in the helicopter. It uses 75 percent of engine power to meet certificated conditions and a 25 percent reserve is available to meet the emergency conditions that could arise, adding to flight safety.

The second level of safety is the unpowered flight mode to which the pilot would resort in the event of loss of engine power or a forced landing. Figure 7

Figure 10

Survival

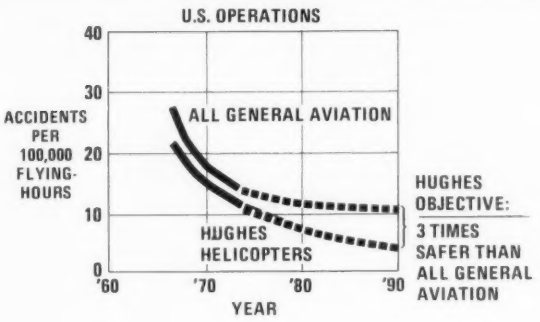


Figure 11

Progress in Helicopter Safety

illustrates speed/altitude flight characteristics. The shaded areas are avoidance zones for the pilot. The aircraft is flown through the "window" of speed and altitude such that the aircraft is always capable of making a safe autorotational landing. This characteristic makes the helicopter unique, contributing to its potentially becoming the safest general aviation air vehicle. In contrast, a fixed wing aircraft must fly through a zone in which the loss of engine power would result in loss of lift and inability to return to the runway prior to impact with the ground.

The helicopter is capable of choosing a great many landing sites with a very high probability of safe landing (figure 8). It has a low drag characteristic which permits a 6 to 1 glide ratio and a 1.5g (gravity) turn maneuverability for selection of an optimum landing site. At 5,000 feet altitude, it has approximately 95 square miles of landing area to choose from, or about 15 square miles at 2,000 feet altitude. Further, the small size of the helicopter (26 feet rotor diameter) requires a very small clearing in which to set the helicopter down safely. Even a typical city street will do.

In event of a hard landing the third level of safety comes into play, i.e., crashworthy structure. The aircraft is designed to help prevent injury to passengers through the use of load absorption and roll bar structure (figure 9). The load absorption structure consists of a shock absorber landing gear and double wall keel beam which progressively absorbs crash loads. A low aftmounted engine prevents it from entering the passenger compartment during crash. The integral seat helps contain the front seat passengers within the safe structure of the aircraft. The rear compartment passengers are cradled in an A-frame (roll bar) structure for crew and passenger protection from rollover.

The value of crashworthy structure is illustrated in figure 10, in which the author survived the crash of a military prototype of the helicopter. Note that the height of the structure was maintained which provided protection for the occupants from rollover injury. This incident dramatically illustrates the value of crashworthy structure for survival.

It has been found that helicopter safety can be achieved without an increase in weight or cost. In fact, this helicopter ended up being 300 to 500 pounds lighter in weight than others having the same flight performance capability. Using the proven design techniques discussed, and standard flight conditions, it has a higher safety record than general aviation aircraft as a whole (figure 11). The significance of this safety is that it opens up the future large-scale use of helicopters for urban transportation which demands the highest level of safety for those on the ground as well as those in the air.

Sikorsky's UTTAS Reaches Density Altitude of 18,400 Feet

Sikorsky Aircraft's YUH-60A UTTAS (Utility Tactical Transport Aircraft System) helicopter reached a density altitude of 18,400 feet during a regular flight testing recently. The twin-turbine helicopter, being developed for the Army, grossed out at 16,000 pounds during high altitude flight operations.

BG William Ford when he was a Colonel. At the time he was director of the Department of Training. With him is LTC G.J. Wolf, his executive officer

ARMY AVIATION HALL OF FAME

BRIGADIER General William Wallace Ford was commissioned in the Field Artillery (FA) upon graduation from West Point in 1920. An avid aviation enthusiast, General Ford obtained commercial pilot and instrument ratings prior to World War II and anticipated the desirability and practicality of using light aircraft for artillery fire adjustment. While a major at Fort Sill, OK, in 1941, he convinced his superiors that he should be permitted to use his personal aircraft, at his own expense, to demonstrate the advantage and utility that light planes offered the Field Artillery.

In May 1941, he outlined his visionary concept of aviation employed in support of Field Artillery in an article which appeared in the *Field Artillery Journal*. [see "Wings For Santa Barbara," June 1974 ***DIGEST***].

General Ford's aerial demonstrations, writings and personal conviction led to fullscale Army tests of light aircraft and their subsequent acceptance and incorporation in FA battalions. After conducting large scale tests during Louisiana Maneuvers in 1942, General Ford established the Department of Air Training at the Field Artillery School. That organization fathered the U.S. Army Aviation School/Center.

The success of Field Artillery light aviation spawned its use in other combat branches of the Army [see "The Army Aviation Story, Parts I and II," June and July 1962 ***DIGEST***]. He organized it and was its first director.

General Ford continued to promote organic Army aviation in successive non-aviation assignments of increasing responsibility until his retirement in 1954.

THE TACTICAL MAP AND YOU . . .

CW2 Nile L. Harter Jr.

Because of the repeated requests for copies of this article, the *AVIATION DIGEST* is reprinting it

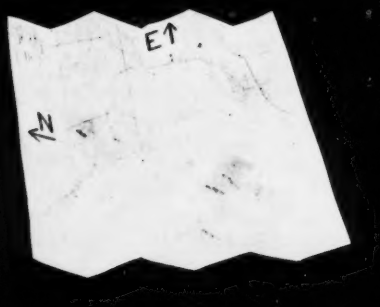
#1 Lay map flat, north at top, face up . . .
N1
. . . fold map in half
N1
N1
#2 Crease each half into three equal parts parallel to center fold just made . . .

DURING MY LIMITED and somewhat trying career as an Army aviator, I've learned, like many before me, that the best source of information is the "grapevine," better known as the chain of command. Information flows from senior aviator to student pilot and back again in a never-ending stream of knowledge. All aviators encounter and relate many problems daily, some of which are specifically related to a particular aircraft class and type, and others which pertain to aviation particulars that every pilot is likely to experience sometime during his career. Having been recently counseled and enlightened on one of those so-called common problems by a senior aviator, I would like to share my findings with fellow aviators and make my contribution to that valuable grapevine.

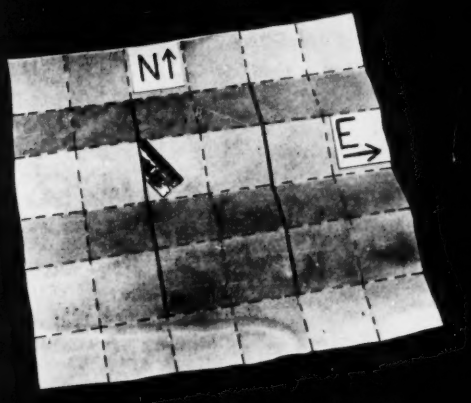
Most publications used for instrument flight and radio navigation are not only designed for quick reference but are also physically small and easy to use in the cockpit. Most charts used for instrument flight come prefolded for systematic use in a limited-space compartment. But, what about visual flight publications and more specifically charts used in a tactical or less formal situation that an aviator might encounter while flying missions outside the Continental United States?

How about the aviator who must navigate by reference to a tactical or geographical type chart using the pilotage method? He must be, as they say, outside as well as inside the cockpit with his head on a good swivel using an unfolded 33 x 40 inch, 1:50,000 scale tactical chart wadded or stuffed in his lap in an already cluttered cockpit. How many ways do you know of folding a chart for quick and easy reference, small enough for storage in the pocket of your flight suit and efficient enough to provide an excellent tool for visual navigation?

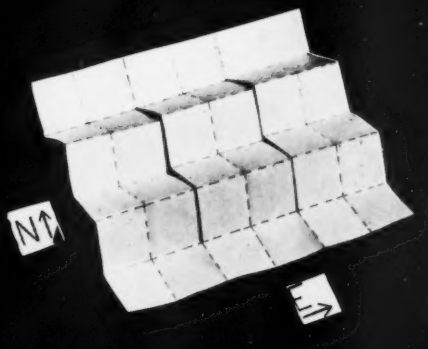
#3 Open map face up, east at top . . .



fold in half turning top edge down to meet bottom edge and then repeat step #2

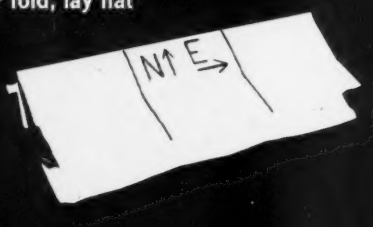


#4 Open map, lay flat north at top and with sharp blade neatly cut along heavy lines (dotted lines represent folds made)



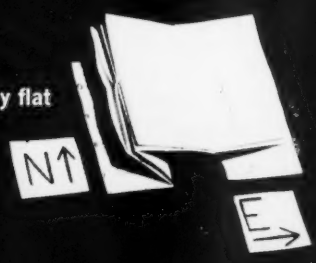
#5 Disregarding cuts, using folds previously made, fold into parallel east and west sections

. . . open to center fold, lay flat

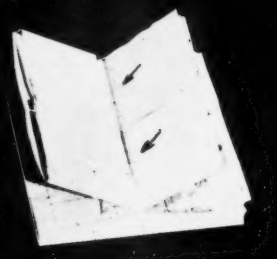


#6 Disregard cuts, using folds previously made, fold into parallel north and south sections

. . . open to center fold, lay flat

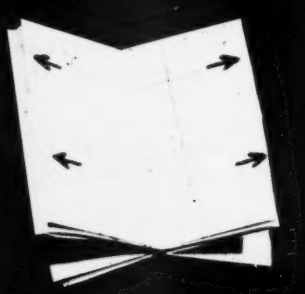


#7 Turn map over as it is now folded and using a single strip of tape form a binder (tape) as illustrated

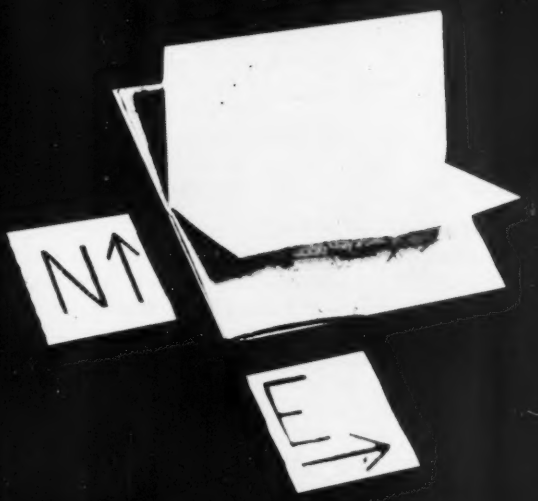


#8 Turn map over and using taped folds as a binder (step #7) you should now have a three-section, two-page book-map

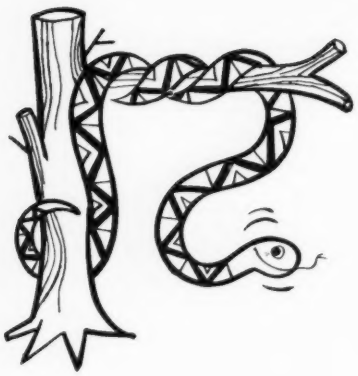
#9 To finish the book-map for use, tape or glue the eight places where the edges you have cut come together (two places at each arrow)



#10 If the map has been properly folded, cut and taped, you will find that there are not only three usable sections from east to west but each of those sections can be folded north or south as desired. There are three usable sections folding north and south within each usable section folding east and west



Following step #10 your book-map should be ready for use, however, the addition of cardboard covers and gluing down of loose corners will prolong service and add to the durability. With little practice one will be able to navigate with ease to any given point on the map by simply folding or turning sections north, south, east and west. Good luck



"FANGS"

PFC James Zahrt

Public Information Office
U.S. Army Aviation Test Board
Fort Rucker

Snakes are not as evil as believed. Their reputation evolves from too much adverse publicity

IMAGINE YOURSELF to be an Army aviator forced to land in an area infested with literally thousands of venomous snakes. Would you know what to do to prevent being bitten? Would you know what to do if you were bitten?

Test pilots and personnel of the U.S. Army Aviation Test Board located at Cairns Army Airfield, Fort Rucker, recently were given the answers to these and other questions when Colonel William Schane, head of the Aviation Medical Research Division, U.S. Army Aeromedical Research Laboratory, Fort Rucker, and a herpetologist (herpetology is the branch of zoology dealing with reptiles and amphibians), gave a lecture and demonstration on the nature and characteristics of poisonous and nonpoisonous snakes.

COL Schane brought several snakes to the briefing, including a poisonous coral snake, a copperhead and an eastern diamondback rattler to show what the "real thing" was really like.

COL Schane said that snakes are not as evil as commonly believed and that their bad reputation comes from too much bad publicity.

Out of the almost 7,000 people snakebitten each year in the U.S., only about 15 die. The vast majority of those bitten did not actually receive any venom from the bite.

On the other hand, the common honeybee accounts for 35 to 40 deaths per year in the U.S. and is the second most dangerous creature to man. The first is man himself.

In the nature of human behavior, people take things personally. That is, most have an attitude that snake fangs and venom are made specially for use against humans.

Fangs and venom are in fact a vital part of a snake's digestive system. The fang is a device used to puncture the flesh of an animal. Then the venom, which is actually a powerful digestive enzyme, is injected into the animal from the venom glands. (These glands in snakes are the same glands in humans that swell when we develop the mumps.)

Once the venom is injected, the digestion of the animal has begun. The snake will then swallow the animal whole, digesting the remainder within its stomach. When a human is bitten, the damage and pain are the results of actual digestion of body tissues.

Because the venom is so vital to the snake's survival, it would rather not waste it on something so inedible as a human.

When a snake is encountered by a human, it first will try to escape. If this doesn't work and the snake is trapped, it will intimidate by rattling, hooding or hissing (depending on the type) and then will bite—but only as a last resort. The snake will never bluff; it doesn't have to.

In the Alabama area, snakes to beware of are: eastern diamondback rattlers, canebrake (timber) rattlers, pygmy (ground) rattlers, the cottonmouth (moccasin), the copperhead and the coral.

If you don't know the different types of snakes or how to identify them, here are a few rules of thumb to follow.

The break between the head and the body on a poisonous snake is very pronounced, while nonpoisonous snakes are almost straight from head to body as it there were no neck.

If one day you're climbing over the rock ledge of a mountain and happen to come face to face (or cheek to fang) with a snake, look it straight in the eye. If its pupil is vertical and elliptical, you've got

something to worry about. You're carrying on a tet-a-tete with a poisonous snake. But if the pupil is round, the snake is more than likely nonpoisonous.

Looking at the underside of a snake (in the event you ever get the chance), you'll notice it to be covered by a series of wide, large scales called scutes. On poisonous snakes these continue almost to the tip of the tail. Nonpoisonous snakes have scutes too, but they only go as far as the anal vent, after which is a series of overlapping scales.

These characteristics apply to most snakes and will get you by in the majority of cases. But one snake that is an exception to the rule and is both common and deadly is the coral.

Coral snakes have all the characteristics of a nonpoisonous snake and there are even a few other snakes around which look a great deal like a coral. One of the best ways to tell a coral snake from a false coral is that the bands which cover the coral's body go completely around the snake. On the false coral, the underside is one color.

The coral's color scheme itself can be used as a means to identify it. On corals the color of the bands run red on yellow, while on the false corals it runs red on black. This can easily be remembered using this little phrase: "Red on yellow, kills a fellow; red on black, venom lack."

One of the precautions to take if by chance you don't see the snake (which often happens) is to wear thick boots and unbloused pants.

Some snakes, such as pit vipers, have sensors with which they detect heat. If they encounter heat, they strike. The thick boots will mask the heat and serve as a barrier against the fangs, while the unbloused pants will further serve as a heat barrier and give the snake a false target at which to strike.

Snakes have a limited strike distance. To strike they S-curve their bodies and shoot forward; therefore, they can't strike more than their own body lengths.

Don't think you can get away from a snake by going into water though. All snakes are good swimmers and can bite in water—and, cottonmouths are right at home in water.

Don't step over logs, step on them. When you step over a log, you're giving a snake that might be hiding underneath two chances to strike. If you step on the log, you don't give it any chance.

On hiking trips, always use the buddy system and go with a friend. This way, if one is bitten, the other can go for help.

If all these precautions work to no avail and you are bitten, above all remain calm. Getting excited will speed up the heart and the action of the venom. You want to slow it down. Put a light constricting band between the heart and the wound and go for help.

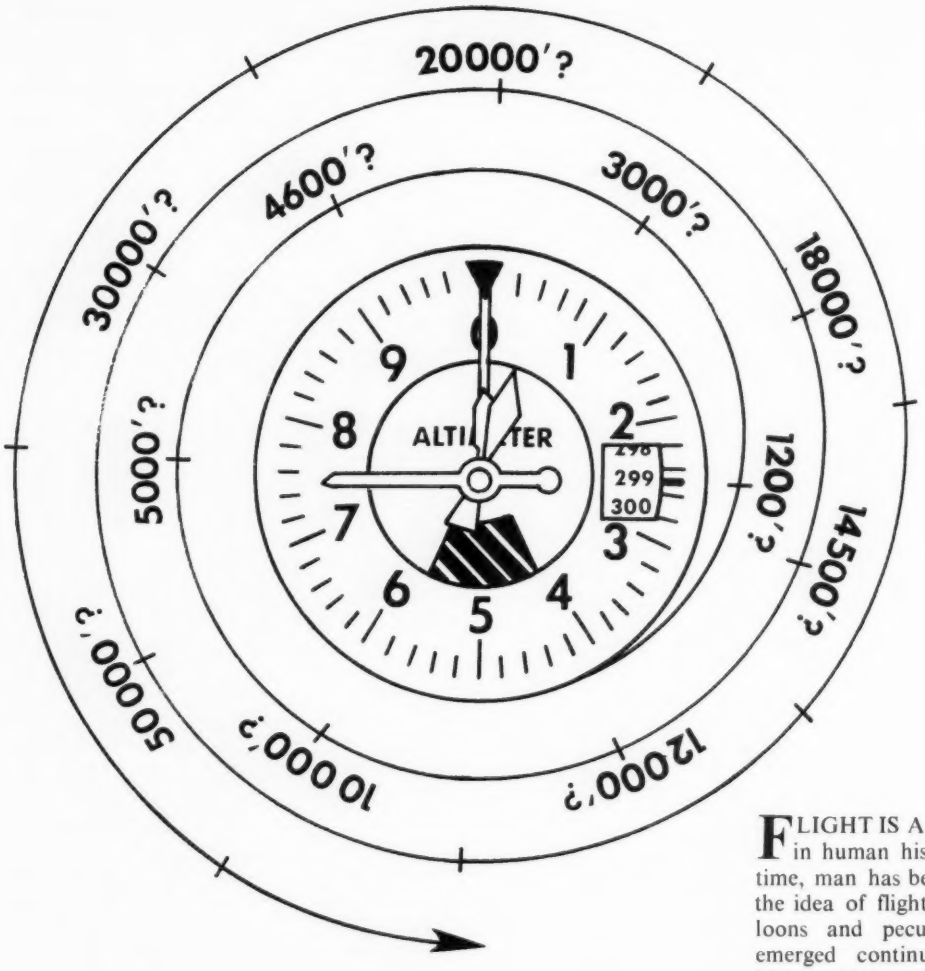
If aid can be reached within 4 hours, keep the victim still and warm. If aid can't be reached within 8 hours, cut a quarter inch incision over the bite and suck out the venom for 1 hour. The venom isn't poisonous to the human digestive system, but it can enter the body through cuts or sores in the mouth.

On your next flight, whether it be a Cobra or a Cadillac, just remember these tips about snakes. You'll never know when you'll be forced to land and come face to face with one.

New Locks Being Installed

The Army is installing ignition locks on its fleet of helicopters. The Army plans eventually to install a series of locks on the doors, batteries and ignitions of all its aircraft.

The new locks, which supplement security services already installed on each aircraft, are to prevent theft.



"ALTITUDINANALYSIS"

Captain Louis B. Trammell

Department of Undergraduate Flight Training
United States Army Aviation Center

FLIGHT IS A recent experience in human history. Throughout time, man has been enthused with the idea of flight. Thus kites, balloons and peculiar contraptions emerged continually in aviation history. Not until 1907 was an astonishing altitude of 1,000 feet reached.

As higher altitudes were attained it was realized there were physiological limitations if man was to exist in the atmosphere. Modern aviation must be familiar with aircraft performance and regulatory publications which quote various restrictions on flight. Physiological restrictions also must be recognized to maintain safety in flight.

Density altitude primarily affects the aerodynamic characteristics of aircraft where pressure altitude affects the body functions. The influence of gravity on the gaseous atmosphere results in a constantly

decreasing density in relation to distance from the surface.

The altitudes are divided into three zones related to how the body performs. From sea level to 10,000 feet is the "physiological zone" where the oxygen level is sufficient for man to function without aid of special protective equipment. The "physiological deficient zone" begins at 10,000 feet where the decrease in oxygen availability causes a noticeable deficit and supplemental oxygen is required to maintain normal body functions. The "space equivalent zone" begins at 50,000 feet where the time of useful consciousness even with 100 percent oxygen by mask is 10 seconds unless the body is pressurized.

Army aviators currently are limited to about 25,000 feet depending on the aircraft. Although hypoxia (inadequate oxygenation of body tissues) is the primary problem encountered at this altitude, range exposure above 18,000 feet pressure altitude can produce nitrogen bubbles within the body. This is referred to as decompression sickness, or the bends. Important variables which dictate the degree the body reacts are exposure time, temperature, physical exertion and physical fitness. Night vision begins deteriorating as low as 5,000 feet and at 12,000 feet may be reduced 50 percent.

Oxygen want is not the only thing that can happen as you go up. Scientific law states that gas expands or contracts in proportion to the pressure put on or taken off. During ascent to high altitude, the gas in various cavities of your body expands and can cause trouble if it gets trapped with no means of escape. For example, in the ear the trouble arises in the small air space behind each eardrum. These air spaces connect with your throat through two narrow tubes called the eustachian tubes. These tubes emerge as slits in the throat wall just back of the nose. The tube is the only way air can get in or out of the middle ear without breaking the eardrum.

When you take off for higher altitudes, the decreasing pressure outside at first causes the eardrum to bulge out a little, giving a sensation of fullness in the ear. Immediately afterward, you often feel a click which is the eardrum popping in place as the expanded air in the middle ear is expelled through the eustachian tube. During descents the equalization of pressure is not quite so automatic. The problem is the slit in the throat end of the eustachian tube may act as a flutter valve letting air out but resisting its going in. Usually swallowing or yawning is sufficient to clear the tubes. Another method, although less desirable, would be to close your mouth, hold your nose, and blow gently.

Clearing the ears becomes quite difficult when you have a cold, sore throat, ear infection, sinus trouble or other causes of swelling of the tissues around the opening of the eustachian tube. Rapid descents and ascents, even at low altitudes, as in maximum performance and poweroff maneuvers can readily affect internal body pressures. Due to the increased atmospheric pressure at lower altitudes a change from 11,000 feet to sea level is approximately equivalent to an altitude change of 30,000 to 12,000 feet.

A change of air pressure in the sinuses produces much the same kind of difficulty as in the ears, though not as often. The sinus cavities that cause "sinus trouble" are located just above your eyes and next to the nose in the cheek bones. Unlike the ears, the sinuses are almost equally affected by either a decrease or increase of air pressure. During swelling of the sinus membranes, as with colds, terrific pain may occur during rapid altitude changes. Equalization of pressure may be possible by yawning, swallowing or blowing with your nose and mouth closed.

Another place where expanding gas can get trapped is in the 30 feet, or so, from mouth to rectum known as the gastrointestinal tract. Normally, this tract contains about a quart of gas, mostly swallowed air but partly gases given off by the ferment and decay of food being digested. By the time 18,000 feet is reached it will double in volume. "When does the balloon go up?" In the ordinary course of events one begins valving off this gas in both directions. If difficulty is experienced, gas pains and cramps may become severe and even lead to incapacitation. To preclude the problems of trapped gases one should avoid such foods as onions, cabbage, beans and carbonated beverages before flying.

Gases within the body tissues and blood also will expand during rapid pressure drops, as in rapid ascents, and cause gas bubbles to form. The symptoms of this depend on the site of the bubble formation. Pain in the joints, or "bends," usually occurs around the knees and shoulders; however, any joints or muscle group may be affected. The "chokes" means difficulties in breathing and other pulmonary problems. Brain or spinal cord involvement can produce a variable picture of interference with coordination and paralysis. Often visual abnormalities and persistent headaches occur. Because of the varied picture of decompression sickness, any unusual behavior at altitude should be considered as a potential sign.

There are other factors which affect the body such as heat, noise, vibration and vertigo. Conclusively, one should not exert himself to an extent that exceeds the abilities of his body. Although there are no visible range markings one must be equally aware of the "red lines" of the body as he is of his aircraft limitations.

Captain Donald B. Skipper

School Brigade
U.S. Army Armor School
Fort Knox, KY

I WANT TO dispel (cough) some vicious rumors and gross (cough) misconceptions about some of us and our friends who smoke (cough, cough). As some of you might have noticed (hack, wheeze), I occasionally indulge in a cigarette or two (cough).

It's certainly my own business whether I smoke or not. I mean, even though the flight surgeon says I shouldn't smoke (cough), I do, and so do a lot of you. Ah, what does he know anyway?

The "doc" said I had better cut down on my smoking (cough) because I was getting short of breath. Baloney! I can run a 100-yard dash in less than a minute and (cough, wheeze) smoke a cigarette while doing it!

Sure—those of us that smoke (cough) probably can't stay under water as long as those of you that don't smoke; but remember, we are Army aviators and we fly in the air—not the water. So I say—take another puff on that cigarette!

I'm married and all I ever hear from my wife is "stop smoking"

Smoking

(cough), ha! She says that she can smell me as far away as the next room because of the smoke (cough, hack). I keep telling her that if she would join me in a few puffs once in a while she wouldn't smell me.

I can't even smell air pollution anymore. I bet no one has thought of that as a benefit of smoking (wheeze)! And another good thing about smoking (cough) is the yellow stain that we smokers get on our hands. When that ol' nicotine starts to build up, it's time to wash again. What a great reminder to keep clean!

Ever since I started smoking (cough, cough), at the age of 12, I've been burning holes in things—furniture, rugs, clothes, women and so on. To those accident prevention advocates that point out the danger of starting unintentional fires with our cigarettes, I say phooey! By burning holes in things, we smokers are actually stimulating the economy!

Another good thing about my smoking habit (cough) is that it helps me keep up that good ol' "dashing aviator" image. My wife's constant complaining about our overflowing ashtrays and our children's constant coughing have driven me out of the house night after night. For the life of me, I can't figure out why those kids are always coughing like that.

We smokers (hack, cough) are more confident and self-assured because *we know* who our friends are. I mean—just try and get into a crowded elevator while puffing away (cough) and you can pick out your friends in a moment! I've stopped socializing with those "so-called" friends who don't have even one ashtray in their homes. Really!

Sure smoking (cough) costs money! A carton of 100 mm cigarettes (that's seven minutes of heaven) costs only about $3 in the good ol' PX. I smoke two to three packs a day, maybe two cartons a week or 104 cartons a year or about $300 worth of satisfaction: (wheeze) what a bargain!

What else, besides smoking, could give me constant mental satisfaction at such a low, low price? The flight surgeon I was talking to the other day agreed with me and pointed out that I was getting more for my $300 a year than I thought (cough). He said that smoking has been linked with or is suspected to be linked with: degenerative heart disease; hypertensive heart disease; cancer of the lung; cirrhosis of the liver; bronchitis, emphysema, stomach ulcers; cancer of the bladder; cancer of the oral cavity, esophagus and larynx and causes tobacco amblyopia— a dimness of vision.

He really got uptight and told me that as an aviator I should know that smoking also degrades the differential brightness threshold of the eyes and depresses visual perception to as great an extent as anoxia at 8,000 to 10,000 feet altitude.

All that technical jargon really put me on the defensive (cough) so I told him that my smoking helps maintain good intestinal tone and bowel habits, has an antiobesity effect and probably elevates my blood sugar!

(Wheeze, hack, cough) Guys like that really bug me. Everyone of us that smokes (cough) already knows all those things. I mean, after all, we're all intelligent people, aren't we? Cough, wheeze, hack, gag, cough . . . .

VIEWS FROM READERS

Sir:

"Baron N1072W you have traffic at 12:00 o'clock three miles southbound. A guard helicopter 500 feet above your assigned and closing." "Delta 454 caution after takeoff; Army helicopter departed two minutes ago maneuvering to the east." "American 235 taxi into position and hold." "Eastern 187 cleared to land runway 27L." "United 563 contact departure: Good day." "American 235 cleared for takeoff. Use caution, Army helicopter in the zone, two north last reported 3500 feet."

The above transmissions are just a few of the perceptions you can get when you turn on your VHF, listen and welcome yourself to the wide wonderful world of air traffic control.

I often wondered if all of the world's aircraft couldn't afford UHF radios so they could talk, or didn't they have as much to say as I did—bouncing along at 90 knots, making position reports (full), calling altitudes and reporting fixes. Then, after leaving the Army for a civilian flying career, I discovered VHF.

VHF stands for very high frequency and is that portion of the electromagnetic spectrum from 118.0 to 135.95 used for communication throughout the air traffic control system in the Continental United States. Included in this range of frequencies is a thing known as UNICOM or 122.8. UNICOM is a universally used frequency that provides traffic advisory services and a common communication channel for traffic entering the traffic pattern or approaching an uncontrolled airport with a UNICOM service. Pilots approaching these airports, if so equipped, should monitor this frequency and relay their intentions to the operator and other traffic.

We in the military have become accustomed to using UHF as a primary form of communication. The airspace in the United States is crowded with 105,000 aircraft equipped with 140,000 VHF non-com sets and is not a battlefield, but that portion of the earth's atmosphere from the surface to 45,000 feet that 164,000 aircraft registered in the United States operate in every day.

Now when I stop to think about 164,000 aircraft up there operating in "my" air and I can't communicate with them, I get a clammy feeling in the pit of my stomach that makes me want to take out my IFR Supplement, find out what frequency (VHF) I should be on, and turn on my set to say "Hello world! I'm here listening, where are you relative to me and are you above or below me?"

Remember, VHF stands for Very High Frequency and will also give you some "Very Heavy Facts."

JOHN B. HUFFMAN
Captain, AR
Mississippi ARNG

Sir:

Your August inside back cover has a note that Major Charles L. Kelly was decorated with the Medal of Honor. This is in error. Although Major Kelly performed many feats that possibly qualified him for the nation's highest medal, he was never so honored.

You possibly have him confused with LTC Patrick H. Brady who, I believe, was the only dustoff pilot who received the Medal of Honor.

Tom O. Mathews
Public Affairs Officer
Brooke Army Medical Center

• You are correct. The *DIGEST* also agrees that Major Kelly did indeed perform many heroic feats. Tribute was paid to Major Kelly by MG Spurgeon Neel in his article, "Dustoff—When I Have Your Wounded," in the May 1974 *DIGEST*.

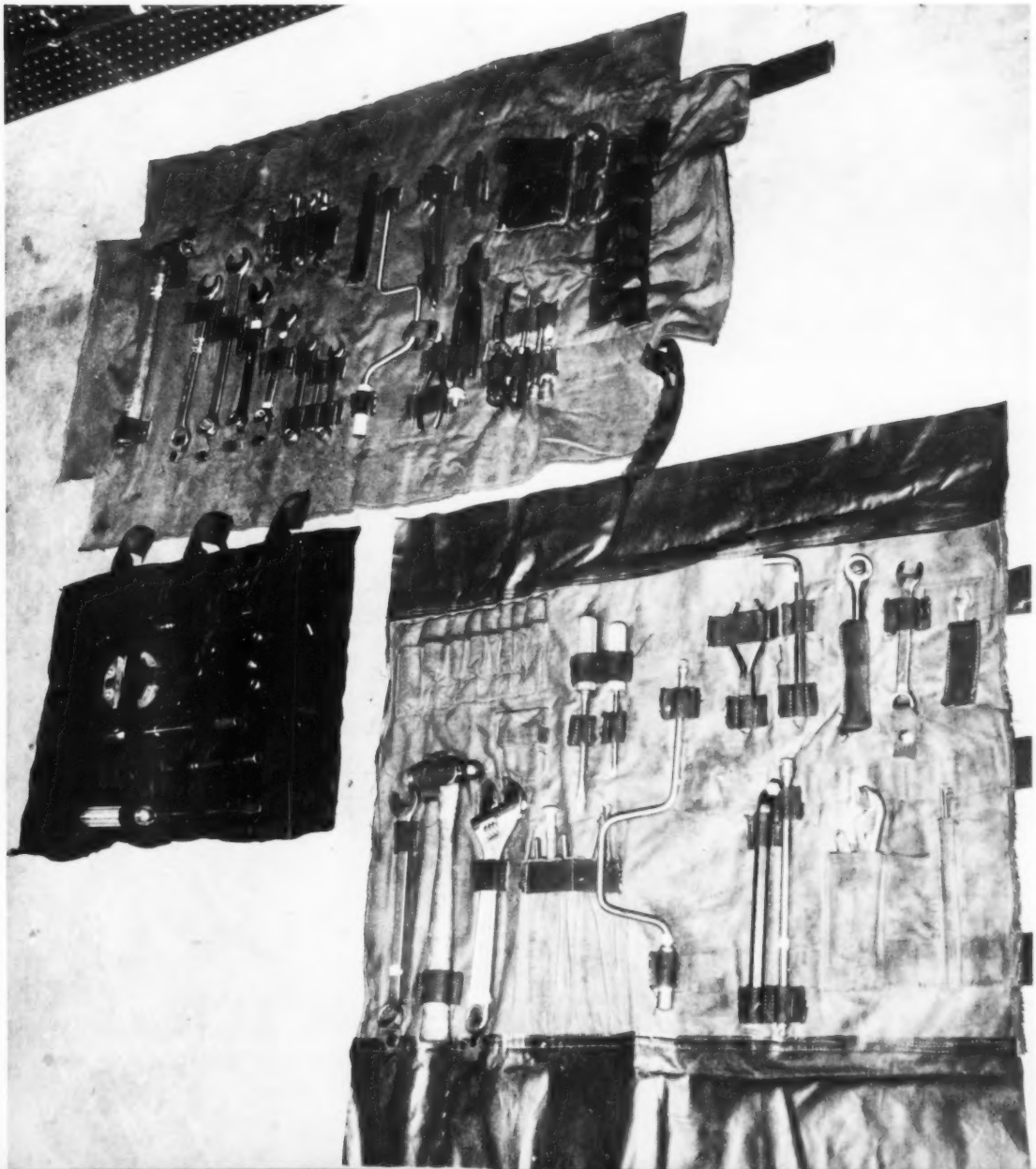
Sir:

Captain McConkey's comments in the July 1975 ***AVIATION DIGEST*** concerning the Navy's tool control program are welcome. The use of this program in this command has resulted in a tool lost rate of zero. It's not that tools haven't been left on aircraft—most importantly, every time a tool has been left, it has been located prior to the job being "signed off" by the inspector.

I believe, however, that some comments are in order regarding the proposed tool-carrying vest. First, we recognize that toolboxes are not always satisfactory. For this reason we have developed tool pouches which are easier

to handle in aircraft work areas and also have the desired "instant inventory" capability. Secondly, the drawing accompanying your article depicts a vest with open-top pockets. These pockets might allow tools to fall out when the wearer bends over with his trunk past horizontal. The third problem appears to be a matter of wearer comfort. In warm climates, I would think the combination of heat and weight would provide a strong incentive for the mechanic to remove the vest for comfort. Should this be done the possibility of dropping

VIEWS FROM READERS

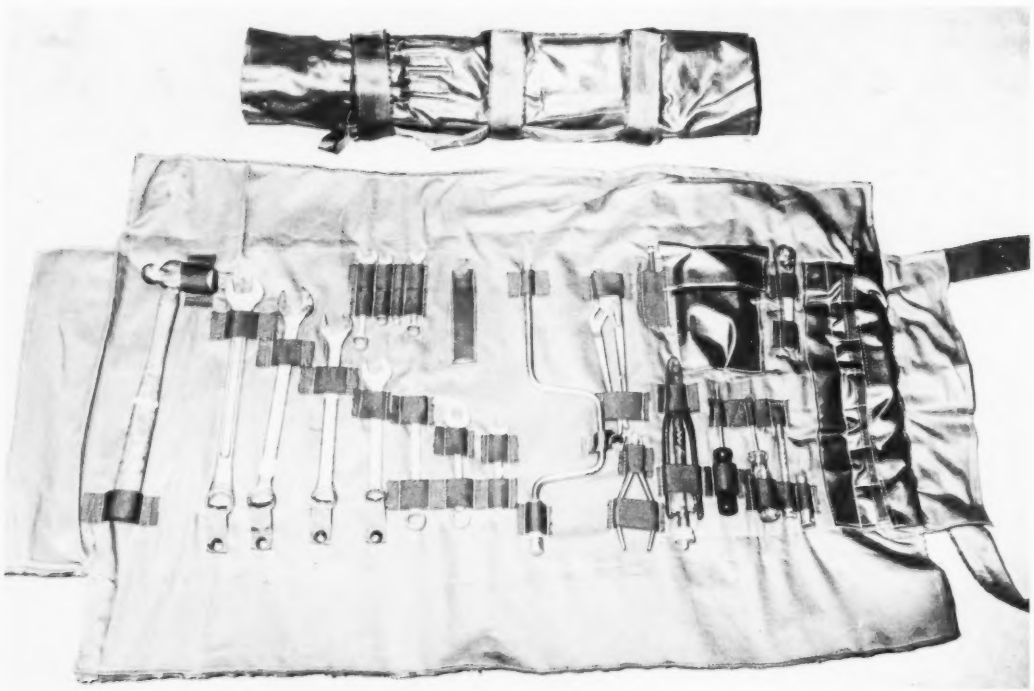


tools would be increased.

Your comments about the savings in tool costs are, if anything, understated! Our initial tool allowance was approximately half of the annual tool expenditure of a sister squadron. Our replacement tool cost has been limited to that required for replacing worn or broken tools only.

The photographs shown here may provide some ideas for discussion.

B.W. Borgquist
Naval Air Station
Norfolk, VA 23511



British Airshow

CW3 Mike Lopez*

UNITED STATES and West German forces last July joined the British at "the Home of British Army Aviation" at Middle Wallop, England, 60 miles southwest of London, to participate in Army Air Day 1975.

Units of the 11th Aviation Group (Combat) from the U. S. Army in Europe flew across the English Channel that week in the first massive movement of U.S. Army helicopters to Great Britain.

The majority of U.S. aircraft participating in the airshow were from the 334th Aviation Company, the only attack helicopter company in the U.S. Army based in Europe. Other 11th Aviation Group participants included members of the 295th Aviation Company's CH-54 Flying Cranes and the CH-47 Chinook helicopters of the 180th Aviation Company.

North Atlantic Treaty Organization (NATO) helicopters, 100 strong from Great Britain, West Germany and the U.S., massed using nap-of-the-earth/terrain flying techniques to form an impressive start to the flying display. The crowds, in excess of 50,000, were told to search for the Army helicopters and that the mission of Army aviation was to fly and see while not being seen. Few of the spectators, in fact only those limited few with trained eyes, could locate the 100 NATO helicopters spread across the horizon until the aircraft lights were turned on and were well within striking distance.

After the dramatic curtain raiser, the aircraft dispersed until later in the day, when each participated in different stages of the 3-hour flying display.

Army Air Day takes place at this Army Air Corps Centre every 2 years. The 3-hour flying display had 21 features including helicopters, fixed wing aircraft, gliders and the "James Bond" autogyro.

Events included a race, formation flying, free fall parachuting, a helicopter balloon busting competition, parachute drops of men and equipment, a mock battle, an airlift of guns, Royal Navy Wessex helicopters and the spectacular British Blue Eagles helicopter display team. A historic touch was added by the appearance and flying display of one of the few British Spitfires still airworthy.

The 11th Aviation Group units based in West Germany provided a 15-minute flying display, as the 334th's AH-1 HueyCobras escorted a troop-laden "Big Windy" CH-47 onto the airfield. The 295th's CH-54 airlifted a 16,000-pound Scorpion British light tank onto the airfield, and four Cobras of the 334th displayed precision flying and the agility and maneuverability of the attack helicopter.

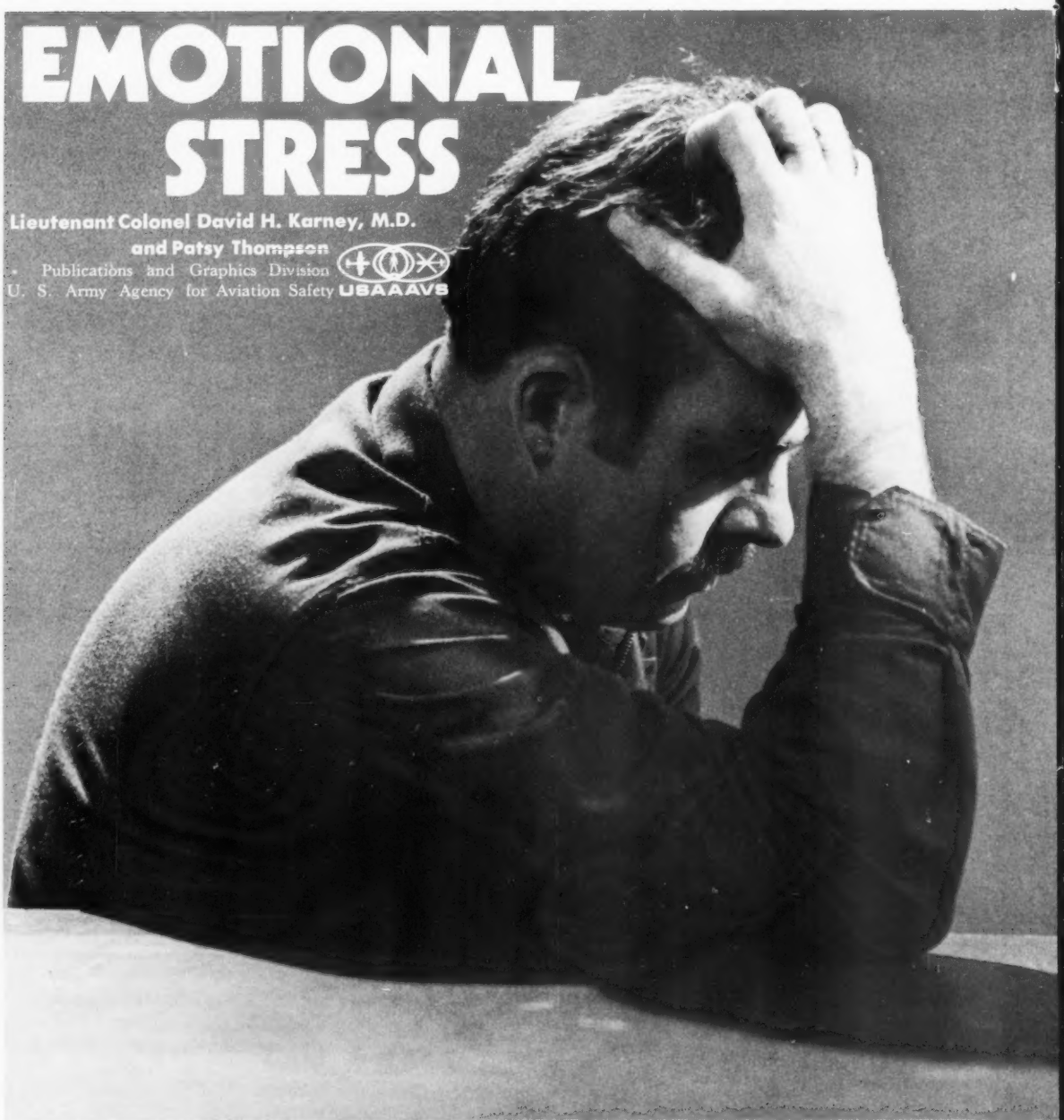
Static displays of aircraft participating in the airshow were available for visitors to see, feel, touch and compare. Other exhibits included British Army equipment, industry displays, sideshows and refreshment stands.

In conjunction with the British Army Air Day activities, the 334th provided helicopter firepower demonstrations of the AH-1 attack helicopter to members of the British Army Air Corps and high ranking government officials who are considering increasing their attack helicopter capabilities.

While giving the firepower displays, the 334th unit members were completing their annual helicopter gunnery qualifications at the British Army Larkhill gunnery ranges, about 80 miles southwest of London.

**CW3 Lopez is a former managing editor of the AVIATION DIGEST*

If you can't solve your personal problems



or shelve them during duty hours, stay on the ground

NOBODY CAN PUT his finger on precisely how many aviation mishaps are caused by letting emotional stress compromise flying ability and judgment. But it's a known fact that some of them are.

We suspect that emotional stress is much more of a problem today, in peacetime, than it was during combat. This is because aviators fly so few hours compared to combat (when they were almost totally occupied by concern for survival) and have more time to become involved in everyday problems.

Pilots are human beings just like everybody else and experience the full range of emotions from love and anger to hate and joy. The danger point, however, is when we allow our emotions to become so strong that they affect our judgment and our ability to function properly.

So was the case of an aviator we'll call CW3 Jim Cardell, an experienced pilot with about 3,000 hours of flight time and with enough service to retire within a couple of years.

Cardell was supposed to be on a local training mission to get his flight minimums. However, it was later learned that his intentions were to fly to his parents' home which was outside the local flying area, pick up his wife and return to home base.

The night before the flight, Cardell slept only 4 hours and reported for duty as normal at 0730. His activities between this time and 1100 hours are unknown. From 1100 to 1600, he was at a bar where he drank about eight bottles of beer, which was considered to be well below his usual daily consumption. He did not eat during this time and it is believed he did not eat all day. He had a habit of eating only an evening meal. He arrived at the airfield at 1630 and filed a poorly prepared and incomplete flight plan. He released the operations EM from duty, closed down the tower and then took off.

It was dusk with overcast skies and isolated rainshowers when Cardell landed his helicopter in a field next to his parents' home. After being on the ground only a short time, he decided to take a friend flying. During the flight, he was performing popup type maneuvers and steep, low-level turns when the aircraft struck a tree and crashed, killing him and his passenger.

The accident was caused by Cardell's exhibitionism. He maneuvered the aircraft into a position from which further flight could not be maintained. Pilot error? Obviously, but there's much more to it than that.

Cardell's personal problems began to surface when he divorced his wife by whom he had six children below the age of 12. Afterwards, he appeared to lose interest in his family and displayed little or no concern for their welfare. He also had a history of financial difficulty. A few months before the accident he had remarried. This added to his financial problems as he then had to maintain a new household as well as pay child support. His financial situation reached the point that he had to be counseled by his commander about his personal and financial obligations.

About the same time he remarried, he was replaced as maintenance officer and was made the assistant operations officer. He enjoyed his job as maintenance officer and seemed to be well thought of by his subordinates. It was reported that Cardell became very depressed over this move, as he considered himself a topnotch maintenance officer.

The change followed an incident which occurred during a maintenance test flight. Cardell had been drinking before the flight and, during the flight, made some violent turns, reportedly buzzed a house and then landed adjacent to a bar where he bought a couple of beers. When questioned about this landing, Cardell claimed he had performed a precautionary landing because the chip detector light came on. Yet, no preliminary report was prepared. Although the airfield commander investigated the alleged buzzing and Cardell's condition, he chose to ignore the incident and give him a second chance. By placing Cardell in operations, he felt he could keep an eye on him and see that he straightened up. However, this change failed to have any effect on Cardell; in fact he seemed to get progressively worse. He continued to drink heavily and his work slacked off. Several times he failed to show up for duty under the pretense that he had other matters to attend to when actually he was spending his time in a bar. Even though he was again counseled, his behavior did not improve.

It should have been apparent to Cardell's supervisors that he was in no condition to fly and was definitely in need of professional help.

For about a year before the fatal accident, Cardell had experienced a number of changes in his personal life—divorce, remarriage, financial problems, being

dismissed as maintenance officer and apparent lack of interest in his children. These events were a source of stress and turmoil within Cardell and emotionally he was a decided accident risk.

Cardell could and should have been identified as unfit for flight duty and referred to a flight surgeon. He had had two major accidents while serving in other units—both due to poor judgment, disregard for regulations and unsafe flying practices.

The first accident occurred when he struck wires while flying over a river at an excessively low altitude on a service mission. He was not proficient in low-level flying techniques and he was not qualified in the particular aircraft. Before this accident, Cardell had been having difficulty transitioning into other types of helicopters and was also in financial trouble. The flight surgeon, made aware of these problems by the commander, discussed them with Cardell only two or three days before the accident. At this time, Cardell was told that he was being watched and evaluated and that he was going to have to perform his flying duties very well. However, this consultation seemed to make no impression on him.

The second accident occurred during a maintenance test flight when Cardell simulated engine failure by closing the throttle in a helicopter while aware that the engine had a history of stopping when the throttle was closed. He then displayed poor technique by initiating autorotation at a point from where he was unable to reach his intended touchdown area. The flight surgeon reported that when questioned about his operational mistakes, Cardell was defensive and gave no evidence that he recognized any such deficiency.

Here we've seen in Cardell's three accidents what can happen when emotional stress invades the cockpit and no corrective action is taken. Although the commander, flight surgeon and operations officer were aware of Cardell's overconfident attitude and his personal problems, they allowed him to continue on flight status.

The commander, in direct contact with his aviators, is best situated to note any significant events or turmoil in their personal lives which affect their performance. When events are present which suggest personal stress, the aviator should be referred to his flight surgeon for evaluation and, if necessary, restricted from flying until these stresses are no longer present. All aviators should be aware of the fact that psychological stress may occur in anyone's life and should be encouraged to seek help if they feel they are in trouble.

Refusal to seek help for emotional difficulties is typical of most aviators. The fear of losing flight pay or jeopardizing their careers prevents many aviators from seeking help for even minor emotional problems. This anxiety on the part of pilots presents a clear and real danger.

The solution to the problem of emotional stress in flight is found in early recognition. Nobody wants Army pilots to try to turn themselves into do-it-yourself flight surgeons or psychologists. Nevertheless, a capacity for mature self-appraisal is a valuable asset, a very important part of which is knowing when the time has come to go to somebody else for help. The point is this: Pilots should recognize their problems early and take steps to correct them before their performance is compromised and consequently their careers jeopardized.

But this isn't always quite that simple. Often the flight surgeon can spot emotional strain, but he isn't always available. However, during flight physicals, flight surgeons should review psychological factors affecting an individual, looking for signs of stress in the person's life. In addition, a portion of some safety meetings should be devoted to pointing out the danger signs of emotional difficulties and what to do if you suspect a fellow aviator's flying ability is being affected. The point is to help one another during periods of personal stress. All of us need to be reminded at such times that extra caution is strictly in order. This is no job for the flight surgeon. Pilots themselves can do it.

Aviators should not be afraid to discuss their emotional problems with the flight surgeon. Minor emotional upsets are usually overcome easily. The flight surgeon can be of great help in many ways, particularly by being able to determine whether problems are serious or not.

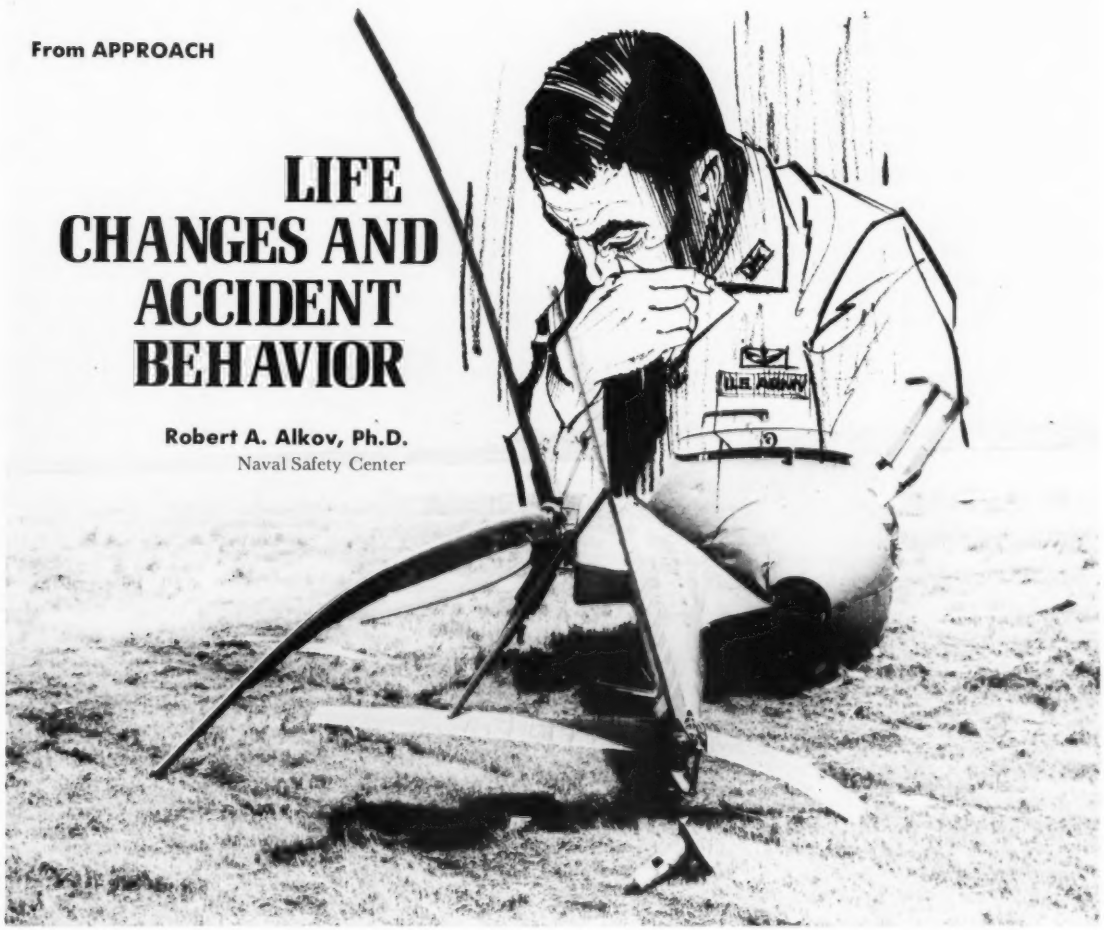
Ordinarily, aviators do not have extensive personal problems such as those experienced by Cardell. But if you do have problems which you can't solve or shelve during duty hours, your best bet is to stay on the ground.

USAAAVS

From APPROACH

LIFE CHANGES AND ACCIDENT BEHAVIOR

Robert A. Alkov, Ph.D.
Naval Safety Center



IN THE PAST, aviation safety human factors analysts have concerned themselves with the determination of individual "accident-proneness." The accepted definition of accident-proneness referred to a stable lifelong personality trait—a chronic condition. Investigations into the personality factors which would be correlated with accident-proneness among naval aviators, however, have proven fruitless. This is because of the rigid selection process which naval aviators undergo upon entering flight training. Most truly "accident-prone" aviators are weeded out early in the game. Also, we know that having repeated accidents does not necessarily indicate accident-proneness. We must first know something of an individual aviator's exposure to hazard and other factors, which along with accident-proneness constitute a person's accident liability.

In addition to constructing a hazard exposure index for each aviator, we need to investigate these other factors which increase a person's accident

liability. Rather than attempt to identify a chronic, long-term condition which may or may not exist in our aviator population, we might be looking at the acute situational factors which may precipitate an accident. By their nature, they are short-lived and hard to pin down. The confluence of all such factors may never have occurred before and may never occur again. At the exact moment of the accident, however, they interact and combine to cause a human error.

The majority of accident behavior can be explained by personal stresses which cause a person to perform in such a manner as to increase his or her accident liability. These stresses may be produced internally or originate from the external world. They are difficult to predict because of their transitory nature.

A relationship between routine stress and diseases in man has long been sought. The practical use of the stress theory of accident and illness causation has, however, been quite limited. Factors causing stress and ability to handle it vary greatly from individual to individual. This variation makes it virtually impossible to quantify stress and to measure its effects in a statistically valid manner.

About 25 years ago, however, a psychiatrist, Dr. Thomas H. Holmes, now at the University of Washington, found that many diseases were correlated with life events. In studies, he asked more than 5,000 patients to tell about life events that preceded their illnesses. These events covered a wide range—death of a spouse, change of job, divorce, birth of a child, etc. These events were noted on the patient's health records and were referred to in later visits.

Between 1949 and 1964, thousands of tuberculosis patients were studied. These patients had experienced life crises shortly before they became ill—for example, jail terms, financial difficulties, divorces, job changes, and repeated residential moves. The life events that were most frequently cited by these patients as occurring before illness struck them were listed.

Not all of the events were negative in connotation. Some were ordinary events of the American way of life: family events, economic events, vacations, retirement, etc. The important factor was change—desirable or undesirable—in ongoing lifestyle—changes which would require adaptive or coping behavior.

CDR Richard Rahe, MC, USN, now at the Navy's Medical Neuropsychiatric Research Unit in San Diego, and Dr. Holmes found that illness follows a cluster of events that requires life adjustment. Each of these events brings about a significant change in the individual's ongoing life pattern and requires adaptive or coping behavior on his part.

To identify those life events that most frequently preceded illness, they asked 394 persons to rate the amount of social readjustment required for each of the 43 events listed most frequently by patients. By an arbitrary method, the life event given the top ranking by the judges, death of a spouse, was weighted 100 points on the scale. Using the rank

TABLE 1.–Life Events Ranked by Adjustment Required

Rank	Event	Mean Value
1	Death of spouse	100
2	Divorce	73
3	Marital separation	65
4	Jail term	63
5	Death of close family member	63
6	Personal injury or illness	53
7	Marriage	50
8	Fired at work	47
9	Marital reconciliation	45
10	Retirement	45
11	Changes in family member's health	44
12	Pregnancy	40
13	Sex difficulties	39
14	Gain of new family member	39
15	Business readjustment	39
16	Change in financial state	38
17	Death of close friend	37
18	Change to different line of work	36
19	Change in no. arguments with spouse	35
20	Mortgage over $10,000	31
21	Foreclosure of mortgage or loan	30
22	Change in work responsibilities	29
23	Son or daughter leaving home	29
24	Trouble with in-laws	29
25	Outstanding personal achievement	28
26	Wife begins or stops work	26
27	Begin or end school	26
28	Change in living conditions	25
29	Revision of personal habits	24
30	Trouble with boss	23
31	Change in work hours, conditions	20
32	Change in residence	20
33	Change in schools	20
34	Change in recreation	19
35	Change in church activities	19
36	Change in social activities	18
37	Mortgage or loan under $10,000	17
38	Change in sleeping habits	16
39	Change in no. family get-togethers	15
40	Change in eating habits	15
41	Vacation	13
42	Christmas	12
43	Minor violations of the law	11

TABLE 2.–Lifestyle Changes During Deployment

Marital separation	65
Change in responsibility at work	29
Change in living conditions	25
Revision of personal habits	24
Change in working hours or conditions	20
Change in residence	20
Change in recreation	19
Change in social activities	18
Change in sleeping habits	16
Change in eating habits	13
TOTAL	249

order method, the other weights were calculated (table 1).

In a pilot study, it was found that of those persons who reported LCUs (life change units) that totaled between 150 and 199 points, 37 percent had associated health changes within a 2-year period of such life crises. Of those with between 200-299 LCUs, 51 percent reported health changes, and of those with over 300 LCUs, 79 percent had injuries or illnesses to report. On the average, health changes followed life crises by one year.

Dr. Rahe made a similar study of 2,500 officers and enlisted men deployed aboard Navy ships. Life change data were gathered for the 6 months preceding the study. The health change data of these men were examined after they had spent 6 months at sea. In the first month of the cruise, the high-risk group had nearly 90 percent more first illnesses than the low-risk group. The high-risk group had more new illnesses to report each month than their fellow sailors.

Dr. Holmes says that although reported illnesses have their own special causes, something else helps them along. This something else is what happens when a major life crisis occurs.

No particular event was linked to a particular disease. Undesirable events—the death of a spouse, for example—might bring about severe depression. Nevertheless, a total of life events, each not in itself especially undesirable, frequently leads to infection, allergy or accidental injury. The important point was the sum—the total impact of life events which require coping behavior. When the life crisis is severe, the onset of illness is likely.

Until recently, application of these findings strictly to accident behavior, however, had never been attempted. The knowledge that the emotionally stressed individual may be more prone to illness and accident is not new. It has long been known, for example, that overstressed individuals often engage in irrelevant activities or rigid stereotyped behavior and experience loss of discriminative skill and mental efficiency. The safe performance of complex tasks (such as those demanded in aviation, for example) is improbable in such a psychological context.

Admittedly, change is a part of the lifestyle of the aviator. Going on deployments or flying across the continent, he is constantly on the move, and, perhaps better adapted than most for coping with these changes. After all, part of the reasons for being in the Navy relate to the adventure and stimulation that come from travel and change. The personality of the average career aviator demands this excitement. Certainly, he would not be in the field as a profession if content to hold only a "nine-to-five" desk job.

The life changes involved in a deployment are changes in residence, family separations, changes in working conditions, sleeping and eating habits, social activities, and personal habits in general. These kinds of changes alone can add up to almost 250 points (table 2).

Their total effect may tax the aviator's ability to cope, even though adapted to a mobile existence. Additional stresses brought on by life crises in one's personal life may add an intolerable burden to that already imposed by the job.

Of course, each person is an individual with a unique personality and method of handling stress. Some people are more susceptible to the effects of emotional factors than others. These changes in an individual's daily style of living and personal family matters may have little influence on performance until they add up to an unbearable psychological burden.

It is incumbent upon those in supervisory positions in aviation units to monitor and observe how turmoil in the personal lives of their pilots/NFOs affects their performance. If a person's performance *is* being affected, the individual should be referred to the flight surgeon for consultation.

The knowledge that changes in lifestyle, whether positive or negative, can tax your coping ability should enable you to construct a life changes factor-weighting score for yourself. This will allow you to predict, within certain probability limits, the likelihood of your being involved in a human error mishap (and guard against it).

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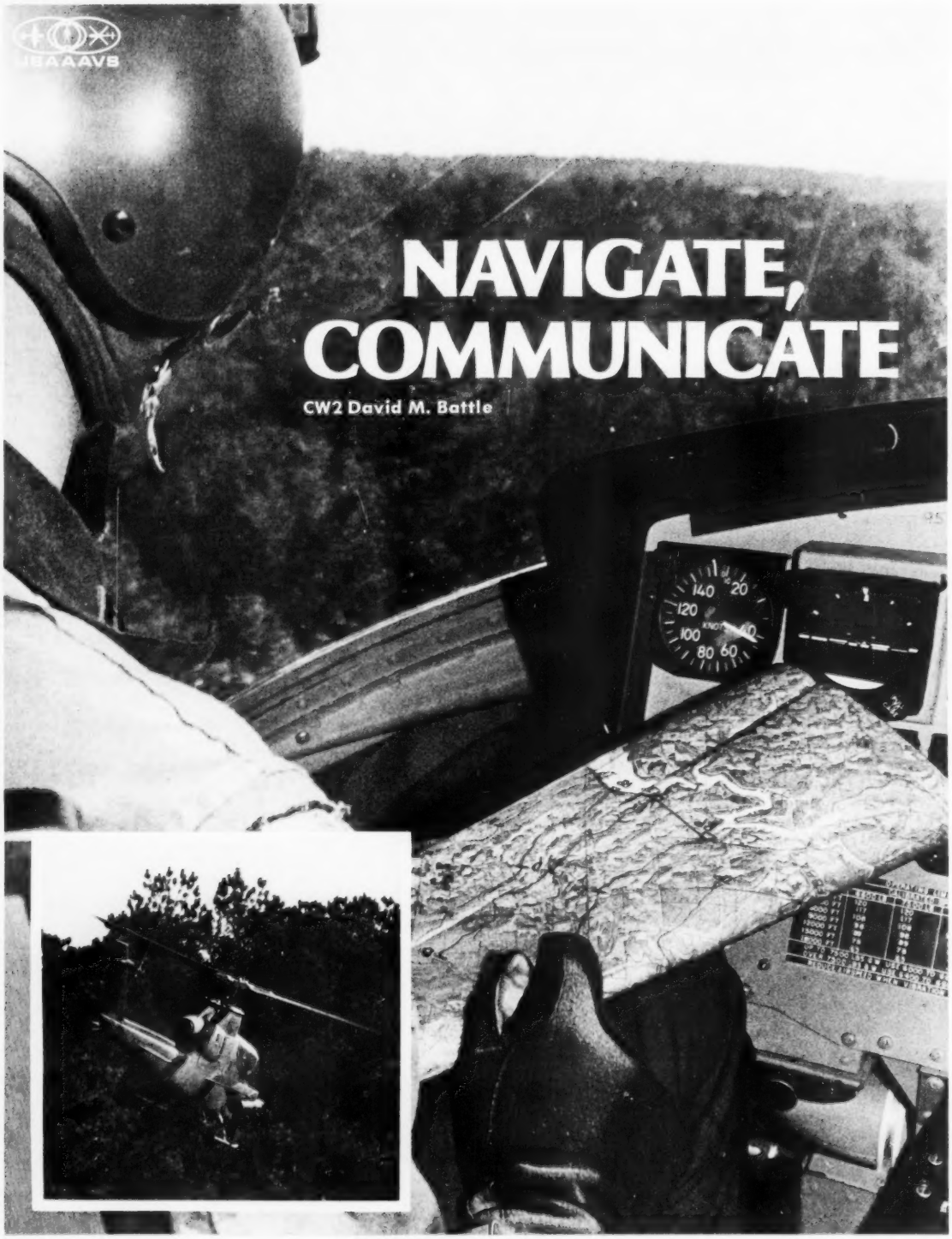
NAVIGATE, COMMUNICATE

CW2 David M. Battle



NOE navigation is not a function but an art . . .

WHEN WE TALK about nap-of-the-earth flying, we are talking about travel over the ground using terrain, usually the lowest terrain, to the greatest advantage for concealment and cover and as as avenue of approach or departure.

There's been a lot of talk about premission planning and the necessity for memorizing a given flight route. Certainly this is an advantage in that complete knowledge of the terrain, the enemy and the weather is necessary for a successful mission. However, more important than the ability to memorize a route is the ability to be placed in any position at any time on a moment's notice and be able to navigate accurately and accomplish the mission.

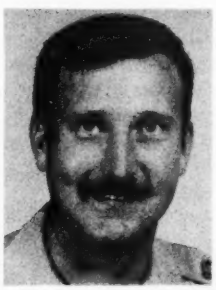
We will have preplanned missions. However, the tactical situation will change rapidly. The forward edge of the battle area, the general outpost and the combat outpost will all vary, depending on our and the enemy's positions. So the ability of the aviator to take a map, relate that map to the terrain and relate the terrain to his map is going to be his bread and butter and the key to his success in a tactical environment.

We get into a fine area here. Navigation in nap-of-the-earth flight is not merely a function but an absolute art. It's the ability to understand visual information received by the pilot as he looks around the aircraft, within his field of view, and takes in the terrain, and then to transfer that information to the information shown on his maps. Once this is done, the pilot has quite a bit of information, most important of which is his immediate position. Once he knows his position, and he knows where he must go, then he must be able to navigate well beyond his immediate location, using all of the combined information from the navigator, maps and what he observes.

A big complaint from students when they first start nap-of-the-earth training is that they "can't see anything." Well, they are not supposed to see much at that point. However, in just a few days, they realize they are actually seeing a lot more than they thought at first. A case in point is high terrain. Let's say we can see a ridge line out of our left or right door. It runs parallel to the course we are following. We also have a map. We see a ridge line on the map in our general area. Now we have started to narrow down our position. We could assume that the ridge on the map and the one we see are one and the same. However, we can't operate on assumptions, so we need more information. We see a stream bed at about our 2 o'clock position so we check for a stream bed on the map and see one depicted. By carefully "unmasking" our aircraft just long enough to observe the stream bed and confirm our suspicions we have determined our relative position within 1,000 meters.

Now let's talk about the back-azimuth method, a precision method of fixing our position. Say there's a hilltop to the left of the aircraft. We look at the heading of the aircraft and if we're heading north, we know we're somewhere southeast of a hilltop. We locate that suspected hilltop on our map and determine azimuth, then back-azimuth. Now, let's say we have a riverbed below our aircraft. By looking at the magnetic compass or the heading indicator, we see that the riverbed is following a general heading of north 360 degrees. We go back to our map and see there is a river that runs about 360 degrees. We run a back-azimuth off of that. Then we locate a saddle at approximately the 1 o'clock position and repeat the previous procedure. We now have three lines converging. The majority of the times—in spite of mag compass deviations—we will not be more than 100 meters from that position.

Once an aviator finds that this will work for him, he will begin to take into consideration more and more terrain features to precisely locate his position. He is not content with knowing *about* where he is; he wants to know exactly. The necessity for knowing your position is critical. Equally important is knowing where you're *about* to be. It is an absolute must to navigate—if terrain permits—a minimum of 2,000 meters beyond your aircraft.



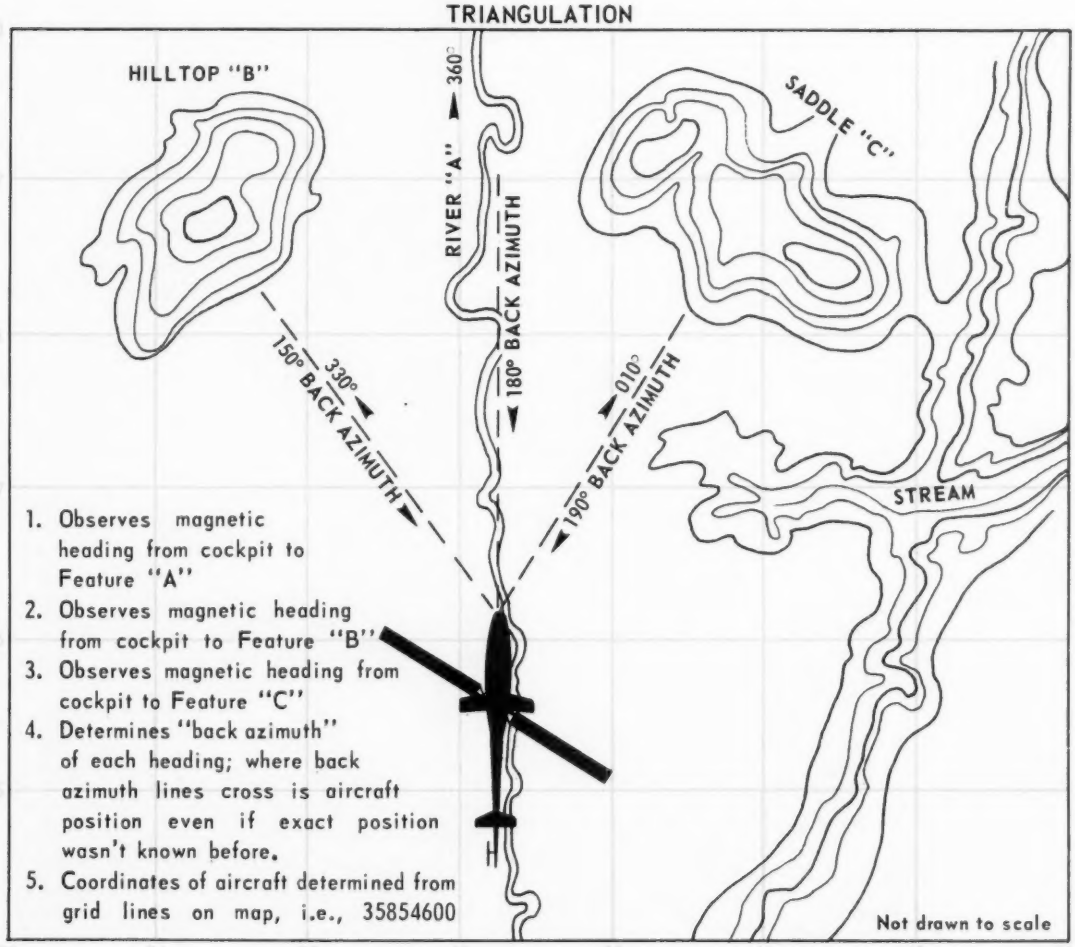
CW2 Battle is a tactics and nap-of-the-earth instructor pilot with the Advanced Division of the Department of Undergraduate Flight Training, Ft. Rucker. He is a branch safety officer and was recently named one of two instructor pilots of the year for the Army Aviation Center

NAVIGATE, COMMUNICATE

When you sit down and take a look at that map, you'll realize it is nothing more than a storybook. It is filled with all kinds of information. By using this information along with what the navigator sees and by plotting your position, even though you can't see over that mountain or around that ridge line, you'll know what is there because you'll be reading it on the map. The map is the navigator's eyes beyond what he can physically see. Now this enables us to not only know about where we are, we know exactly, and we know what is 1,000 to 2,000 meters ahead. It is even conceivable that we could know what is in front of us for miles and miles. This is not theory; this is a proven fact.

Map memorization is certainly advantageous. There is no denying that. However, the ability to navigate on the spur of the moment is much more important than relying on preplanned map memorization.

Another requirement for mission success is cockpit teamwork between the navigator and the pilot and


TRIANGULATION
HILLTOP "B"
RIVER "A"
360°
180° BACK AZIMUTH
SADDLE "C"
150° BACK AZIMUTH
330°
010°
190° BACK AZIMUTH
STREAM
1. Observes magnetic heading from cockpit to Feature "A"
2. Observes magnetic heading from cockpit to Feature "B"
3. Observes magnetic heading from cockpit to Feature "C"
4. Determines "back azimuth" of each heading; where back azimuth lines cross is aircraft position even if exact position wasn't known before.
5. Coordinates of aircraft determined from grid lines on map, i.e., 35854600
H
Not drawn to scale

communication between these two. Common phraseology is required for successful communication. This means words or terms that are to the point, explicit and precise. There is not time for a great amount of eloquence. When it is time for the aircraft to turn, it is time for it to turn and that word alone is sufficient; adding, of course, the direction of the turn.

With students, communication, not navigation, is the biggest problem. They possess a surprising amount of raw ability for nap-of-the-earth operations. But communication, or the lack of it, is the root of most of the problems in NOE training. For instance, if the navigator wants the pilot to turn right one of the more common problems is that he will say, "You are going to turn right, up a draw, or up a hill." Now, let's face it. Turn right is anywhere from the nose of the aircraft from the 12 o'clock position around to the 6 o'clock position to the right hand. The pilot could have five or six choices. We must be more precise. The navigator should tell the pilot to "turn right up a draw that should be at about your 2 o'clock position"; or as a last resort give the pilot a magnetic heading. (Heading information should be given in such a manner that the pilot does not have to focus his attention inside the aircraft.) This will enable the pilot to narrow down his choice of routes and be more precise. This is far better than having to stop and debate over which draw or which hill. If the navigator wants the pilot to turn right or left, he should say, "Turn right, stop turn," when the heading is what the navigator wanted. Only a very few words are necessary to prevent confusion in the cockpit and enable the pilot and navigator to more effectively perform as a team.

The more often that two individuals fly together, the less of a problem they have. However, we are not guaranteed in a combat environment that any given person will fly with another given person day after day. So, it is important that clear understandable verbal terms be used. When the navigator wants the pilot to speed up (usually both the navigator and the aviator are pilots), all he has to say is speed up, or slow down, or stop. This common phraseology is very concise and precise. Such terms as "over there" are incomplete. "Over there" is anywhere. You might as well have not said anything as to say, "that hill over there." The pilot, whose first job is controlling the aircraft, does not have time—nor does the mission—for this process. It is certainly time-consuming and, as we all know, time is essential to successful mission completion in a tactical environment.

We will be required to fly nap-of-the-earth missions both offensively and defensively. Concealment is our greatest asset against the sophisticated weapons that will be used against us. Concealment, communication, speed and accuracy of navigation will be the keys to mission success. An aircraft does not necessarily have to be hovering in a hover-hole (small open area in trees or vegetation) or sitting below the trees to be concealed or masked. To be masked merely means that the aircraft should be lower than the surrounding terrain. If you're navigating up a riverbed, or a draw, and the terrain on the left and right or in back of you or in front is significantly higher, then you are masked.

It may not be necessary to fly below the trees or at NOE altitude over all areas to and from the forward edge of the battle area.This is a hazard in itself and if an aircraft strikes a tree, wire or any other obstacle and crashes, this is the same as being knocked out of the sky by the enemy. We have lost an aircraft, and possibly a crew. The same thing applies in the training environment. It is unnecessary to fly NOE to and from the training areas. Unit SOPs should establish specific flight altitudes for this.

We have to be constantly aware of the hazards involved. There are three hazard areas of concern in low-altitude and NOE flight.

These are natural hazards, manmade hazards and weather. Natural hazards are trees, dead trees (harder to see at lower altitudes), birds and terrain. Manmade hazards are towers, wires, other aircraft and "man-factors" such as fatigue, sickness, etc. Weather hazards should be evident—low ceilings, limited visibilities, etc. Constant awareness of the hazards presented will prevent mishaps during realistic training in a simulated tactical environment. If we have trained our personnel to successfully navigate from one point to another on the spur of the moment, using common phraseology in communication, and if we have made them aware of all the hazards involved in this type of flight, then successful completion of any given mission is virtually assured.

Lieutenant Colonel Jeptha I. McNair Jr.

USAAAVS

SOON—NOTAMs FROM SINGLE SOURCE

DO YOU HAVE trouble getting all pertinent notices to airmen (NOTAMs) when you plan a flight? If your answer is yes, join the crowd. If your answer is no, good! But don't feel too smug. Chances are you may often think you have all necessary NOTAMs when, in fact, you do not. Let's see why.

Presently, two NOTAM sources are available in the U.S. One, the American Central NOTAM Facility, provides notices for en route navigational aids, instrument approach procedures and airfields controlled and operated by the Air Force and the Navy as well as those used jointly (military/civil) in North and South America. This facility is centered at Carswell Air Force Base, TX. In general, it provides adequate service for both the Air Force and the Navy since nearly all their flights originate and terminate at one of their military installations.

In operation, the collection center receives NOTAMs transmitted from military bases by means of a weather teletype network, known as an air weather net, to their automatic digital weather switch—a facility that receives all weather reports and stores the information in a memory bank of a computer. The automatic digital weather switch then ferrets out the NOTAMs and transmits them to the American NOTAM Facility where they are validated before being transmitted to Air Force, Navy and approximately 32 Army installations by means of four loops, or circuits, each of which serves a specific area. However, these installations have receive capabilities only. In fact, the Army has only 17 facilities that can feed information into the Air Force NOTAM system. Further, this system does not provide full NOTAM coverage for all civil instrument procedures published in the DOD FLIP.

A second source of NOTAMs is the Federal Aviation Administration (FAA). Its collection center, known as the Weather Message Switching Center, is located at Kansas City, MO. Civil and military airfields provide information to specific local flight service stations of which there are 318. These sta-

LTC McNair is fixed and rotary wing rated, and a Master Army Aviator. He is chief of the Aeronautical Information Division, U.S. Army Air Traffic Control Activity Aeronautical Services Office, Cameron Station, Alexandria, VA

tions format the NOTAMs received and transmit them to the Weather Message Switching Center during a 4-minute time frame every 20 minutes. The Center, in turn, retransmits them verbatim, along with weather information, to the flight service stations and other activities by means of several service A communications networks. These are civilian main weather teletype networks. The primary communication network is a 40-loop service A net. All stations within one loop receive the same data on as many as 150 airfields. Other service A nets such as the 16-loop military net are also used. In addition, each flight service station has a request-and-reply line whereby data can be obtained on specific airfields other than the 150 for which information was automatically provided. However, this request-and-reply line is restricted to data on airfields that provide information to the Weather Message Switching Center. Except for joint use airfields, not all Air Force and Navy NOTAMs are reported to the Center.

The Weather Message Switching Center does not receive NOTAMs from the American Central NOTAM Facility. Although the American Central NOTAM Facility does receive NOTAMs from the Weather Message Switching Center, it does not store or redistribute them.

Another part of the problem lies in the disbursement of Army aircraft which are based at approximately 216 different locations within the Continental United States, all of which are not Army airfields. Numerous units are stationed at Air Force, Navy and civil airfields as tenant activities.

By now, you may have reached the logical conclusion that all the Army aviator needs to do is simply check both systems and he will be certain of having all pertinent NOTAMs. This is far from being true. Other problems exist. For example, the DOD FLIP Instrument Approach Procedures Publications are printed on a 56-day cycle. The FAA updates their looseleaf instrument approach procedure books every 7 days. If, for example, there is a NOTAM to raise the minimum at Bush Field, Augusta, GA, the FAA will carry that NOTAM until the corrective procedure is published at which time the NOTAM will be cancelled. The same approach in the DOD FLIP will not be updated until a military aviation notice or a new book is published.

Numerous other problems also exist. These include the different criteria used to constitute a NOTAM for the two systems as well as the different language, abbreviations and contractions used. For the Army aviator to be assured of having all NOTAMs for his route of flight, destination and alternate, he may have to check the Air Force system, FAA system, Flight Information Bulletin, Military Aviation Notice, Airmans Information Manual and other sources. The fact that an airfield is tied into some NOTAM communication loop means little. Army aviators must resort to a variety of means to get NOTAMs. These include direct tie-in to the Air Force and/or FAA system, drop lines, local and long distance telephone calls.

Early this year, the U.S. Air Force proposed to the other military services and FAA that a single U.S. NOTAM system be developed. In March of this year a meeting was held with representatives of the military services and FAA to discuss this proposal. All parties present indicated their strong support toward achieving this goal. The single U.S. NOTAM system as proposed would alleviate the current NOTAM problems for the Army aviator in that all NOTAMs would be readily available from one source. A summary of the benefits follows:

- One data bank for all NOTAMs.
- Availability of all NOTAMs from one source.
- Standard NOTAM criteria.
- Standard language (contractions and abbreviations).
- Single directive (handbook).
- Single manager (FAA).

While the long range goal of the proposed NOTAM system is to consolidate and automate NOTAMs worldwide, the plan calls for those in CONUS to be consolidated by early 1977. At any rate, Army aviators can be assured that the U.S. Army will promote, participate and collectively support the present movement to achieve a single U.S. NOTAM as soon as possible.

briefs that teach

tuned out

An AH-1G pilot and copilot were flying at about 75 feet and 80 knots. They had just completed their part of an NOE fire suppression demonstration mission and were returning home, trying to stay out of sight of the demonstration area. **Both were listening to a commercial station on the ADF radio.**

As they were approaching a ridge which would require a slight climb, the engine tachometer dropped to zero. The copilot first noticed the low engine rpm audio and warning light. He glanced at the instrument panel and saw the engine rpm tachometer on zero. He looked at the N_1 gas producer tachometer but could not tell how much engine power was being produced.

The copilot then used the VHF radio to transmit "engine failure." At this time the pilot initiated an autorotative turn to his right rear. Two-thirds of the way around the turn and 20 to 30 feet agl, the pilot turned off the engine fuel control switch. The helicopter encountered a high sink rate and the pilot used his remaining collective pitch to cushion the landing.

This crew was not mentally prepared to react to an emergency while flying low level.

Both crewmembers failed to properly evaluate engine power available indications and the true nature of the emergency (e.g., partial versus total power loss). This can be attributed to the copilot's anxiety and his hasty radio transmission and the pilot's acceptance of the copilot's statement without verifying his engine instrument readings.

A 180-degree turn at low level was initiated and completed. Partial power was used to accomplish this maneuver, but available power was then negated when the pilot shut the main fuel switch off. The pilot knew a forced landing area was to his rear and flew the aircraft, unknowingly using power, part of the way through the turn.

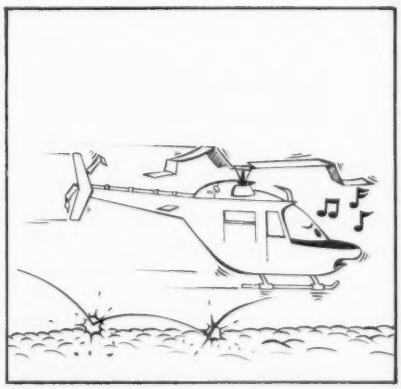
Air discipline starts on the ground. Crews should use the ADF radio only for its intended purpose—navigation.

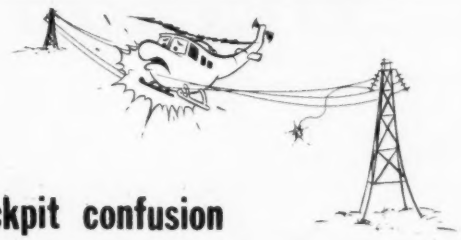
Available data indicates that appropriate command emphasis has been directed to ensure that distractions to the pilot are kept to a minimum while participating in low-level flight and that commercial radio broadcasts will not be monitored.

still tuned out

An OH-58 pilot was flying at night to a forward area refueling point. The flight proceeded *routinely* and the pilot entered the approach on a heading of 310 degrees, vertical rate of descent of 400 to 500 feet per minute, and an approach angle of between 8 and 10 degrees. At the bottom of the approach he recognized the rate of closure as too fast and applied power but failed to correct the problem. The aircraft hit the ground in a skids-level attitude and bounced back into the air before settling back to the ground and rolling on its right side.

The pilot's failure to recognize the indicators of a high sink rate in time to apply proper corrective action can be attributed to a lack of recent night OH-58 experience. He had flown only 1.2 hours of night time in the previous 120 days. **However, there's a good chance he was distracted by the ADF radio which was tuned to a commercial broadcasting station.**





cockpit confusion

The pilot of a UH-1H was climbing through 2,200 to 2,400 feet msl at night. Suddenly the engine and rotor rpm dropped off toward 6200/310 rpm and the aircraft yawed slightly. Engine and rotor needles stayed joined.

The pilot entered autorotation and assumed a complete engine failure with throttle in the full open position. The copilot decided on a power-on autorotative descent to a landing and checked his instruments. Rotor rpm was in the lower green, engine rpm was approximately 6200 and airspeed was holding at 80 to 85 knots IAS. Neither crewmember could remember the torque reading but N1 was above the reading of 90 percent. The pilot flared the aircraft at about 100 to 150 feet agl. Both pilots were on the controls. They saw a high tension tower and increased flare and collective to clear the wires. Rpm started to drop rapidly. Collective was lowered, putting out the low rpm light and audio. This indicates that power was available but a lag in the droop compensator caused by rapid application of collective pitch to clear the wires caused the decrease in engine rpm. All remaining pitch was pulled with a full application of cyclic to the right rear but the wires could not be avoided. The aircraft hit the wires nose high and slid down the wires approximately 100 feet before hitting the ground.

There's a lesson here for pilots and commanders alike. Pilot error was a factor because of the crew's failure to correctly analyze the emergency and their confusion in emergency procedures. Supervisory error is indicated by inadequate emphasis being placed on a training and standardization program within the unit.

tilt

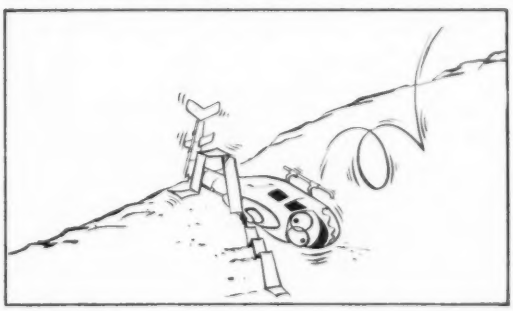
The pilot of an OH-58 had flown several sorties, including pinnacles and slope operations, when he was told to pick up a passenger. He arrived at the landing site, brought the aircraft to a hover and descended until ground contact. The aircraft became airborne again, then rapidly settled back to the ground, rolling over on its right side.

The pilot attempted to land in an area where the average slope was 14 degrees. This was beyond the safe limitations for slope landings in this aircraft.

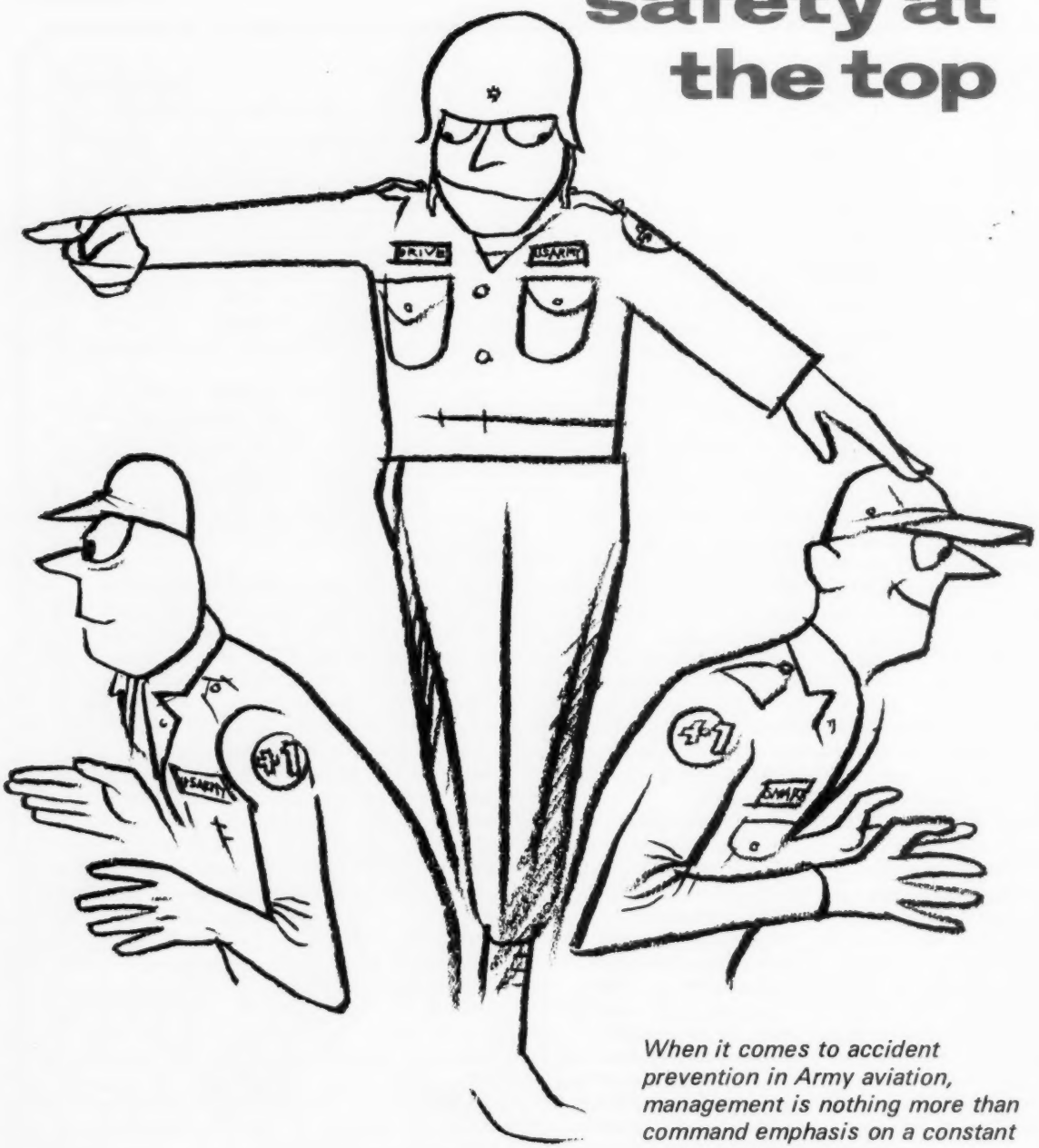
Depending on winds and gross weight, 5 degrees to 8 degrees is the maximum slope for the OH-58, and at 15 degrees slope the aircraft will roll over if one skid is on the ground and lift approximately equals aircraft weight.

The pilot had not performed slope landings since his qualification training in the OH-58 the year before.

The site where the accident took place was apparently a frequently used area. As such, qualified persons should have been required to reconnoiter the area, select, identify and possibly mark a suitable landing zone to minimize obstacles and excessive slopes. **Had this been done, the element of pilot judgment which precipitated this mishap would have been eliminated.** Obviously, field sites used for only a brief period do not require this, but just as any tactical position is continuously improved, action should be taken to optimize landing zone safety if frequent or prolonged use is intended.



safety at the top



When it comes to accident prevention in Army aviation, management is nothing more than command emphasis on a constant and coordinated program . . .

Ted Ferry
Safety Management Department
University of Southern California

MANAGEMENT ROLES in safety might also be referred to as supervisory or command roles in safety, but they are all management roles at some level. In connection with management, we have all heard the saying that "you cannot legislate safety." OSHA proponents may question that one. Another one is "You can lead a horse to water but you can't make him drink." The point is that you cannot *make* people act safely. You cannot enforce safety into being. It is not feasible to pass out the order: "Effective tomorrow, there will be no more accidents."

What can a manager or commander do? One thing is to convince the organization that management recognizes its safety responsibilities and is dead serious about improving safety performance.

Have you noticed that when the old man is a camera bug, everyone gets a camera and starts talking photography in the hallways? Watch the boss get some water skis and see what happens in the organization as far as water sports are concerned. We all know people who have become "interested" in golf or gin rummy because the chief had a hankering for it. The point is that interest at the top inevitably finds its way down through every layer in the organization. It never fails with the boaters, bridge players, golfers, night flyers, boy scouters and safety backers. Yes, when the old man makes it plain he is interested in safety the organization gets interested too.

There are a lot of ways for the top man to make it plain he is serious about safety, but remember, he can't make the horse drink even if he leads it to the water. A manager can hit pretty hard though. If the word gets around that safety is a basis for budgets and promotion this sets a firm stage for working up interest. It must be more than lip service. Top management must demonstrate continuing interest in safety; the example must be set.

There should be no question that managers at all levels have a responsibility for safety. This is as it should be. Who knows more about the area of operation than the manager involved (you might call him a supervisor at the operating level).

It is the responsibility of the manager of an operation to be an expert on the safe conduct of that operation. It is up to him to set the example and develop safe methods in his subordinates. It is not up to safety personnel to do this for him. Any manager who thinks that safety personnel are going to prevent accidents for him is going to fall short of his objectives. If he condones unsafe practices he is not operating properly or efficiently.

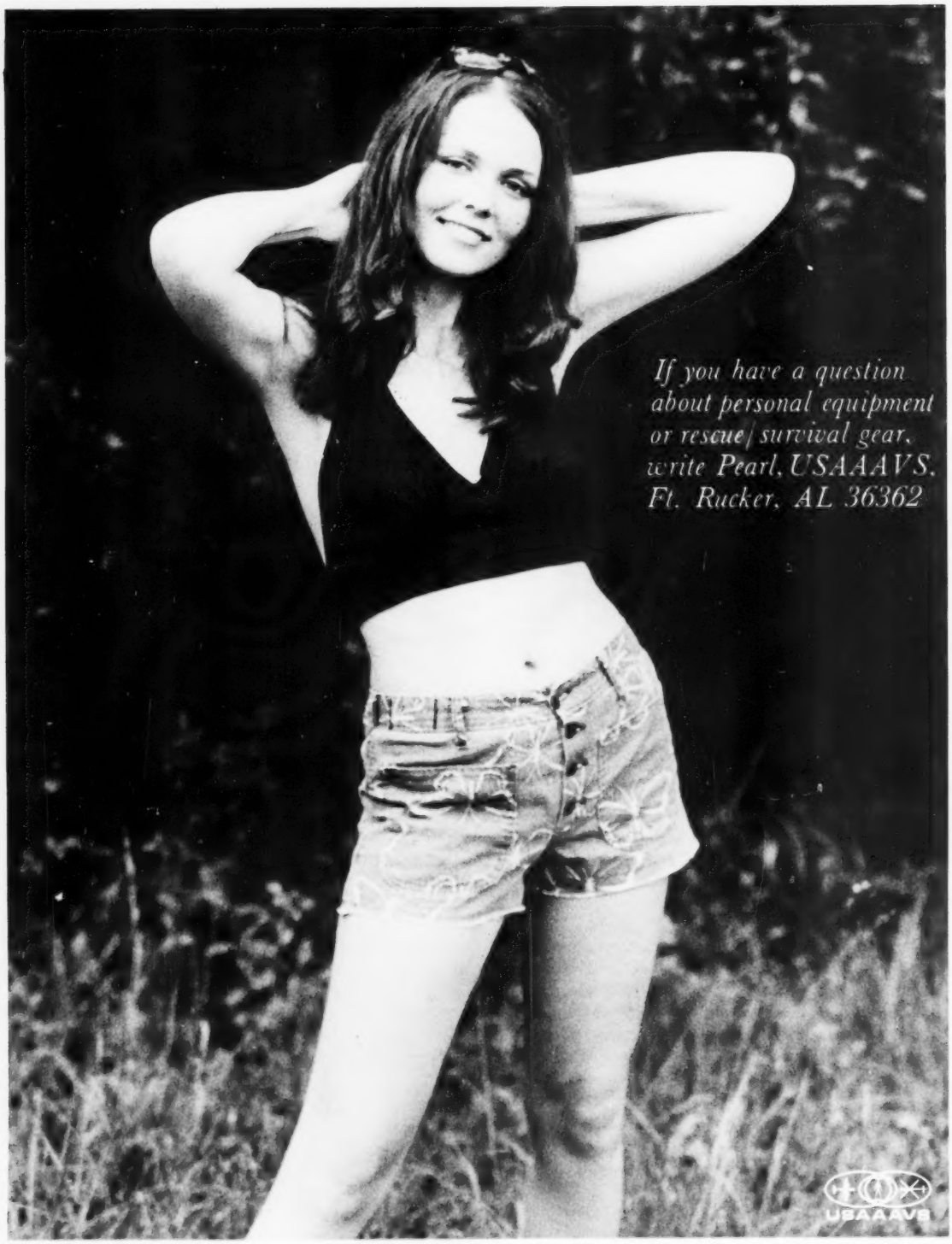
Do you rely on safety personnel to find your safety problems? If your answer as a manager is yes, or there is hesitation, then you're part of the problem. Look at it this way. In no manner is the safety person responsible for telling a manager how to do his job. He may help him do his job as far as safety is concerned but he doesn't do it for him. Safety personnel are only another management resource, not a substitute manager.

When we look at accidents from the multi-cause approach we find an element of management in nearly every case. Even in the "clear cut" example of pilot error there is room for management involvement. Suppose a pilot is faced with a situation and fails to react as the accident board thinks he should have. This "caused" the accident. "Why" he failed to react properly will always bring in management. Was he faced with a situation not of his own making, or that he was incapable of handling? If so, make supervisory error an additional cause factor. Most emergencies that a pilot might face originate with someone else. That points the finger at supervisory management.

In the case of pilot error accidents, for example, there is an element of management error if there was inadequate training, if flight proficiency is down, if standard operating procedures were inadequate, if hazards were not eliminated, if there was insufficient crew rest, if there were maintenance or inspection deficiencies or if instructions were not clearly understood. In the cases often labeled as "pilot error," you can see that management/supervision has ample opportunity to contribute to the accident.

A man tries to do a job the way *he thinks* it should be done. That is a key phrase. If he is doing it the way he thinks it should be done and has an accident, someone has given him the wrong information or guidance. Instructions and directives must be clear. The attitudes and examples set by management are stronger than the written word. Managers don't escape responsibility just by notifying someone else of the proper technique. If safety is lax, then management has failed in its job to educate, observe and correct.

SUPERVISION
+SAFETY = A
WINNING TEAM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Personal Equipment & Rescue/Survival Lowdown

Signal Kit Flare and Cartridge

Signal Kit, Foliage Penetrating, NSN 1370-00-490-7362, is currently issued with the SRU-21/P survival vest and contains a flare gun and "insert type" flare cartridge. The flare cartridges used in the old type AP25S-1 signal gun, NSN 1370-00-886-9788, are identifiable by the caps and screwthreads of the cartridges. Some of these cartridges have loose caps and bad threads. This pengun and cartridges are being phased out of the supply system as shelf life expires. Should you have the old signal flare gun and cartridges, extreme caution should be exercised; i.e., if the firing control is in the forward position the "gun" is unsafe to load as the firing pin will contact the cartridge when loaded and could cause premature firing of the flare. NOTE: Users of survival equipment and accessories should be properly trained in use of the equipment prior to issue. For further information, call the aviation life support equipment manager, USAAVSCOM, St. Louis, MO, AUTOVON 698-3241/3291.

SPH-4 Helmet Visor Assembly

There appears to be some confusion about which is the tinted visor for the SPH-4 helmet. Visor Assembly, Neutral, NSN 8415-00-490-1196, is the tinted visor. Action is being taken to reflect this in the next change to TM 10-8415-206-13, Operator, Organizational, and Direct Support Maintenance Manual, including repair parts and special tools list for the SPH-4 helmet.

Special Measurement Clothing

Could you assist me in obtaining extra long sleeve Nomex shirts and jackets? I currently wear the large long shirt and, while flying, approximately 3 inches of skin is exposed between the glove and the sleeve. I have a 37-inch sleeve length measured from the middle of the back to the wrist bone with my arm bent 90 degrees. The Nomex shirts and jackets currently in the supply system are not adequate. Two other people in this unit have a similar problem and, as the unit supply officer, I cannot find any solution through normal supply channels.

Army Regulation 32-4 covers supply of clothing to individuals who cannot be properly fitted with catalogue sizes or by authorized alterations thereto. The individual requiring the special measurement clothing should be measured for the clothing at a military service clothing sales store and the measurements recorded on DA Form 358. The requisition and special measurement blanks should be forwarded to Commander, Defense Personnel Support Center, ATTN: Directorate of Manufacturing (DPSC-M), 2800 South 20th Street, Philadelphia, PA 19101.

Survival Kit

Could you tell me how to requisition and maintain the Survival Kit, Individual, Tropical, Tactical Aircrew?

The Survival Kit, Individual, Tropical, Tactical Aircrew, NSN 6545-00-782-6412, was removed as a preassembled component of Survival Kit, Individual, Vest Type (SRU-21/P), NSN 8465-00-177-4819. Detailed procurement instructions are contained in U.S. Army Support Center, Philadelphia, PA 19101, Supply Information Letter No. 1-75.

Issuance of this kit through medical channels complies with the comprehensive Drug Abuse, Prevention and Control Act of 1970, public law 95-513. Thus, after issue the aircrewmember should retain the kit in his possession.

Chapter 10, Army Regulation 40-61, dated April 1968, with changes 1-7, covers storage and issue of medical assemblages. The Survival Kit, Individual, Tropical, Tactical Aircrew, is considered a medical assemblage. Paragraph 10-2(b) establishes the commander's responsibility for budgeting, funding, requisitioning, storing and maintaining assemblages authorized to be on hand in units or overseas depots.

The components of minor medical assemblages consist of items listed in the Federal Supply Catalogue, DOD Section, Medical Material, C6545-II, Volume 2. USAAAVS recommends the kits be inspected by qualified personnel to ensure the components are of proper type and quantity. Outdated or unauthorized controlled drugs must be turned in through medical supply channels to an accountable officer for destruction.

USAASO Sez

Instrument Approach Clearances Procedures Being Revised

FOR THE PAST 11 months, much confusion has existed in the aviation community over the meaning of *approach clearance;* so much confusion in fact, that FAR (Federal Aviation Regulations) 91.116f was revised. As a result of the revision of FAR 91.116f relating to a pilot's receipt of an approach clearance when operating on an unpublished route, or while being radar vectored, the ATC (air traffic control) procedures for issuing approach clearances are being revised. While it may seem more desirous not to issue any altitude information because the regulation now requires the pilot to comply with certain altitude requirements, it is felt the ATC system should assist the pilot in this regard by furnishing altitude assignments with approach clearances under these conditions. This provides a doublecheck between the controller and pilot as to the proper altitude a pilot must maintain, and to what point, after an approach clearance is received under these conditions.

To provide a better understanding of the revised procedures, new definitions were needed, as well as clarification of some of the existing ones. The FAA (Federal Aviation Administration) has completed this much needed task. The results of their effort are:

- Final Approach Course: A straight line extension of a localizer, a final approach radial/bearing or a runway centerline.
- Radar Approach: A prescribed or approved instrument approach procedure which utilizes precision approach radar or airport surveillance radar.
- Segment of an Instrument Approach Procedure:
  a. Initial approach is the segment between the initial approach fix and the intermediate fix or the point where the aircraft is established on the intermediate course or final approach course.
  b. Intermediate approach is the segment between the intermediate fix or point and the final approach fix.
  c. Final approach is the segment between the final approach fix or point and the runway, airport or missed approach point.
  d. Missed approach is the segment between the missed approach point, or point of arrival at decision height, and the missed approach fix at the prescribed altitude.
- Unpublished Route: A route for which no minimum altitude has been published or charted for pilot use. It may include a direct route between NAVAIDs (navigational aids), a radial, radar vector or a final approach course beyond the segments of an instrument approach procedure.

In addition to the procedures contained in FAA Handbook 7110.8D, para 1020, aircraft operating on unpublished routes shall be issued approach clearance only after the aircraft is:

- Established on a segment of a published route or instrument approach procedure.
- Assigned an altitude to maintain until the aircraft is established on a segment of a published route or instrument approach procedure.

NOTE: 1020b(2)/478b(2)– The altitude assigned must assure IFR (instrument flight rules) obstruction clearance from the point at which the approach clearance is issued until established on a segment of a published route or instrument approach procedure.

First Woman Army Flight Surgeon

CAPTAIN DOLORES M. LEON, MC, is the first woman qualified to wear the wings of an Army flight surgeon.

She received the badge after completing the 7-week Army Aviation Medicine Basic Course at the Aeromedical Activity, Aeromedical Center, Fort Rucker, last September.

CPT Leon is a graduate of the Reedley Joint Union High School, Reedley, CA. She received a bachelor of arts degree from the College of Notre Dame in Belmont, CA and in 1974 she was graduated from the University of California-San Francisco School of Medicine with her medical degree.

She entered the service in 1973 as a senior medical student, and after graduation served her internship at the Letterman Army Medical Center in San Francisco.

QUESTIONS?
PROBLEMS?
REQUESTS?

We do not have someone to answer your telephone calls around the clock, but now the Department of Army-Wide Training Support (DAWTS), at the U. S. Army Aviation Center, Ft. Rucker, has a telephone answering service. The numbers to use are:

Commercial: 205-255-3098
AUTOVON: 558-3098

This answering service is beneficial not only to individual soldiers but also to unit training officers. Action will be taken on your questions, requests, or comments within 24 hours of receipt.

Don't get "hung up" on differences in time zones. If you can't personally contact someone at DAWTS, leave your name, unit, telephone number and requirements with the answering service and request that we call you back. We'll get in touch with you as soon as possible, or will have your material in the mail the same workday your request is received.